AMERICAN FORESTS

AUGUST 1944

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AMERICAN FORESTS

VOLUME 50 AUGUST, 1944 NUMBER 8

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THE COVER

Sunset on Georgian Bay
Photograph by John Kabel

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American Forests

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THE
AMERICAN FORESTRY
ASSOCIATION

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The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of its magazine—AMERICAN FORESTS—designed to keep before the people of the country important conservation questions and issues, the Association carries on educational work in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. Its resources and income are devoted to the advancement of conservation in the interests of public welfare, and all citizens are welcomed to membership.

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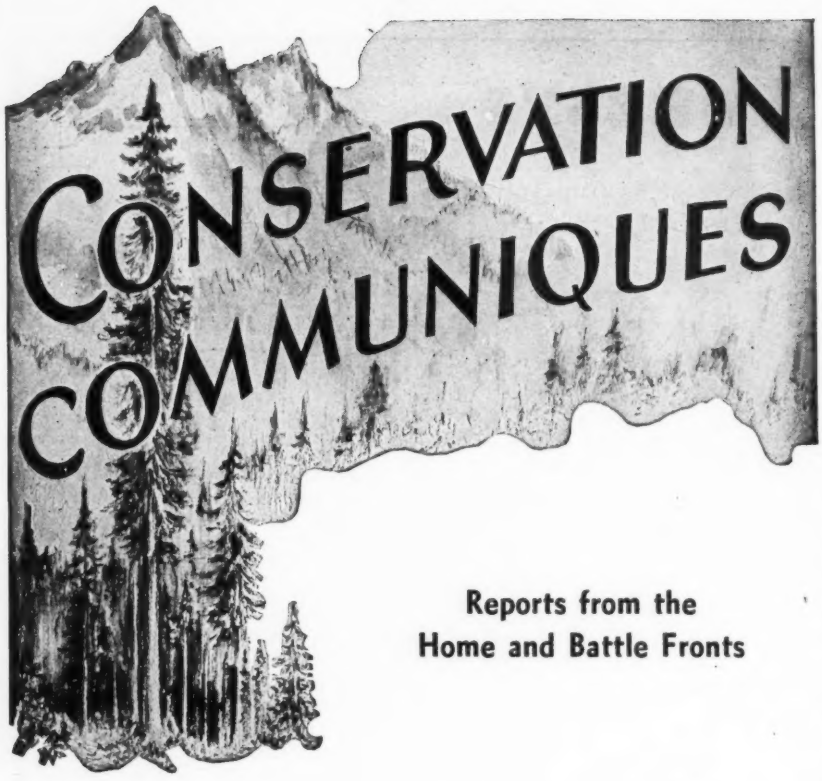


Reports from the Home and Battle Fronts

The town of Pascalis, Quebec, with a population of 700, was destroyed by forest fire early in July. One life was reported lost. The fire, whipped by a high wind, threatened several other communities, causing the evacuation of 1,500 residents from this mining district.

• • • •

Because of a severe lumber shortage, the Requirements Committee of WPB has allotted maximum quantities to claimant agencies and WPB industry divisions for the third quarter of 1944—the first time such action has been taken on lumber by the committee. The total allocation, which is in effect a ceiling on third quarter use, amounts to 9,152,000,000 board feet. Of this, major industrial consumers will receive 5,219,982,000 feet; the Army and Navy, Aircraft Resources Control Office, Maritime Commission, Foreign Economic Administration and the Canadian Division collectively will receive 1,568,241,000 feet for direct military and export requirements; the War Food Administration 1,294,295,000 feet; and 692,507,000 feet is reserved for military sponsored industrial facilities, Red Cross disaster use, maintenance of essential transportation facilities, utilities, etc.

Wood pulp available for use during the third quarter will be approximately 2,821,000 tons, compared with 2,885,000 tons for the second quarter. Total domestic production is estimated at 2,547,000 tons and imports from Canada at 261,000 tons, in addition to which a seasonal withdrawal of 13,000 tons of pulp from inventory is anticipated.

• • • •

The first Africans to become forest supervisors recently completed training at the Ibadan Forestry School in Nigeria, according to the British press. This is the first school of its kind on the continent. Next year students from other colonies will be admitted, many of whom will take a two-year course for technical assistants.

• • • •

As the result of negotiations undertaken at the request of the United States Government, E. I. du Pont de Nemours & Company is making its neoprene synthetic rubber process available to the Soviet Union. Full technical details necessary for building and operating plants to produce neoprene are being sold to the People's Commissariat of the Rubber Industry of Russia.

In anticipation of a proposed postwar broadening of its activities, the Division of Fish Culture of the Fish and Wildlife Service, Department of the Interior, has been changed to the Division of Game Fish and Hatcheries. Also, the Division of Fishery Industries has been renamed the Division of Commercial Fisheries. The first will continue to propagate fish and develop farm pond programs; after the war, however, it will embark on an extensive program designed to gear production of fish more closely to actual needs of fishing areas. The second will continue to be devoted entirely to commercial fishing interests.

• • • •

In two years of intensive training courses, the U. S. Forest Products Laboratory, Madison, Wisconsin, has "graduated" 10,240 men and women as specialists in packaging, aircraft wood inspection and related wartime uses of wood.

• • • •

Canada has established at Cornwall, Ontario, its first plant for the recovery of lignin from waste liquor in the manufacture of pulp and paper. It will be used for conversion into a variety of commercial plastic products — from cosmetic jars to house building materials.

• • • •

Shelterbelt schemes are under consideration by Kenya's Soil and Water Conservation Committee, as a part of this East African colony's postwar plans for forestry development, according to the foreign press. One belt has already been planted for experimental purposes.

• • • •

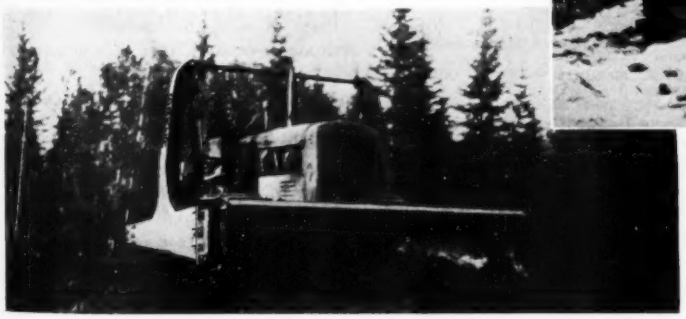
The United States and Canada have launched a cooperative experiment to test methods of applying sprays from aircraft for controlling the spruce budworm in Ontario and Quebec. Spruce-fir forests in this country now threatened with invasion of the budworm include New England areas, particularly in Maine, and the Lake States.

• • • •

Possibilities of a postwar establishment of a permanent pulp and paper industry on the Tongass National Forest in southeastern Alaska, will be surveyed this summer by Lyle F. Watts, chief of the U. S. Forest Service. The forest supports hemlock and spruce timber said to be sufficient to produce annually around 800,000 tons of sulfate or sulfite pulp.

One ranger and a Baker can quickly cut fire blocks, dozing trees and underbrush, covering over highly combustible leaves, needles and branches, and grubbing out roots.

Baker Bulldozers also speed cleaning up of burned over timber lands to facilitate new growth. They quickly pay for themselves, replacing unavailable manpower in national and state park, game preserve and reforestation nursery work.



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VOLUME 50 . . .

OBSERVANT readers may already have noticed that 1944 marks the fiftieth birthday of AMERICAN FORESTS. It has been indicated in the volume number (50) on the contents page each month.

This is a long time in the service of conservation—long enough, we believe, to review with pardonable pride a brief sketch of its history. In name, size and format there have been many changes through this half century; but in purpose it has been unwavering. This purpose is to keep the American public factually and currently informed as to their forests and related resources of soil, water, wildlife and outdoor recreation.

Forest Leaves, published in Pennsylvania, became the first official organ of The American Forestry Association in the 1890's. At the turn of the century, with the purchase of *The New Jersey Forester* from John Gifford, pioneer forester, the Association issued *The Forester*, and later, in 1902, with the development of increased recognition of land use responsibilities, it also absorbed *National Irrigation*, the official organ of the National Irrigation Association.

The magazine was then published under the name of *Forestry and Irrigation*, but in time this was considered too restricting and was discarded in favor of *Conservation*. This action followed the stimulus given the subject of conservation by President Theodore Roosevelt when he called in 1908 the now famous Conference of Governors at the White House; and the later absorption of the National Conservation Association and its magazine.

In 1910 it was decided that the magazine of The American Forestry Association should carry a name more closely defining its purpose and activities, and *American Forestry* was adopted. This continued until 1924, when it became *American Forests and Forest Life*, by which name it was known until 1931, when it was changed to AMERICAN FORESTS.

Throughout its long history the editorial policy of the magazine has been broad and tolerant, its pages an open forum for discussion. The 50-year file of the magazine is without question the best historical record that exists,—year by year and month by month, of the growth of conservation in this country.

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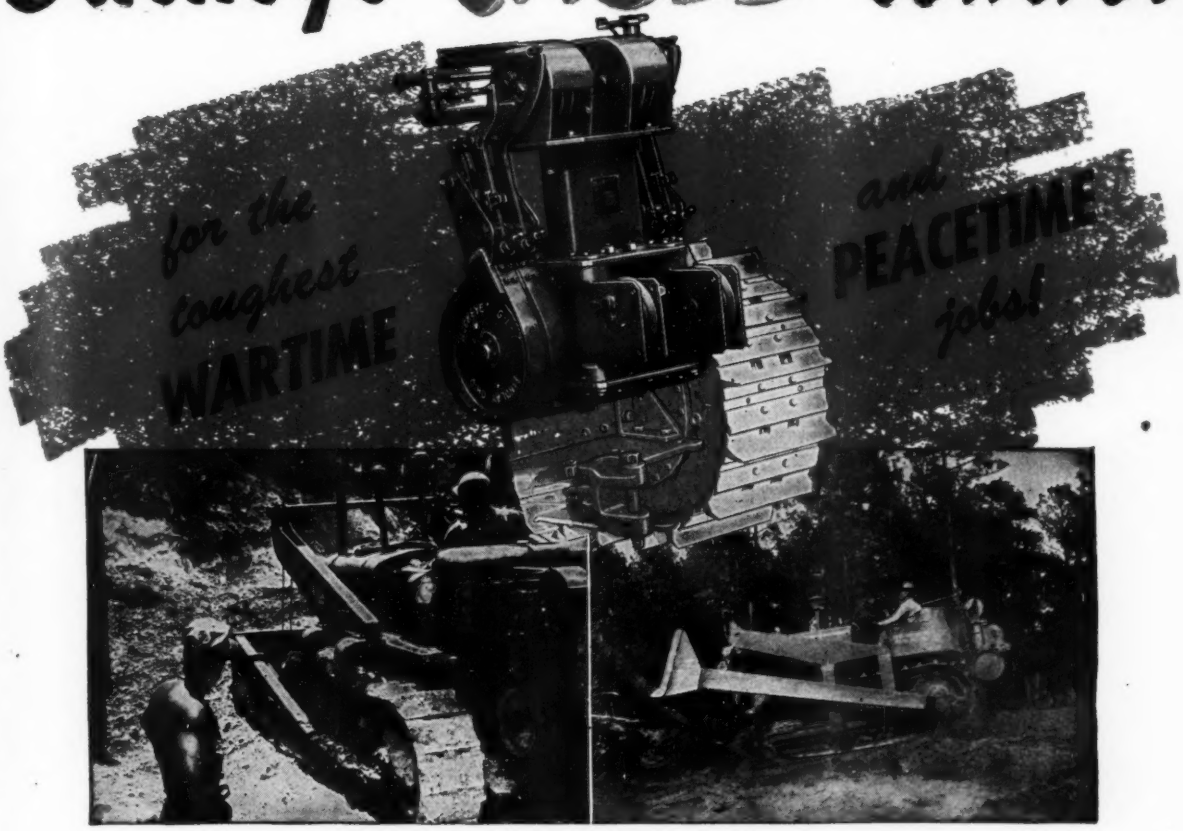

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Buckeye

Sierra Sunset

The sun's last rays lean toward the farthest hill,
And all the manzanita gleams blood-red
As ancient martyr's sacrifice; long shafts
Of yellow light pierce through the honey-bronze
Of redwood spires in golden corridors;
Thin trails of smoke steal through the giant groves
Like wraiths from ghost-fires of an ancient race;
The rocks stand white against the indigo
Of sky, and gleam with jeweled granite-dust;
The sun slips down a trail of pine-fringed sky,
And tall sequoias wait in silence for the moon.

—Edythe Hope Genee

Editorial

DESIGN FOR COMMUNITY FORESTS

PERHAPS the greatest weakness in the conservation movement in America is that, as applied to the individual citizen, it is more or less impersonal. No one, witnessing the incalculable waste of war, can close his mind to the urgency of any measure that will help in the long pull back to resource normalcy. Yet, because as a people we have failed to personalize our conservation interest, we are, as individuals, slow to personalize our service.

Considering the national and, in many respects, missionary character of the movement, this is not surprising. Conservation grew to its present stature on principles the average citizen was called upon to support—not to apply. It involved theories and techniques too often beyond his horizon, regions and problems only remotely known. This process is too indirect, too impersonal, to fire the spirit of intimacy that makes the individual part and parcel of conservation. It fashions converts, not practitioners.

However necessary this process may have been to weld together a national conservation structure, it is, fortunately, not too grooved to recast. The wellspring of enlightened land use is knowledge—not for a few, but for all. The individual interest that, harnessed and directed, would nourish and protect the soil and all life that it supports, needs only the stimulus of simple truths and the opportunity to apply them to become a moving force in any community. Not generalized truths, such as have largely been the case in the past, but an intimate, personalized knowledge of what grows underfoot—on the home grounds, so to speak.

This is why community forests, and their counterparts in county, town and school forests, loom so large in the future conservation picture. They stem from interest that has become personalized. Like all community endeavor, a forest so designated and managed becomes an intimate part of the individual household, a tangible something that fits into the pattern of everyday life. A healthy environment, good water, increased revenues, lower taxes, lumber and fuelwood, sustained employment, recreation, beauty—these spell "conservation" in terms every man, woman and child can understand. And, among other things, these are blessings a community forest, properly established and managed, bestows upon the people.

We know this to be true because community forests for years have proven their value in the Old World. One classic example is the 4,428-acre forest of an Alpine village of 2,600 people, which not only pays all taxes but provides an annual cash income of around $100 to each family. This, of course, in addition to a variety of other benefits. America, with its great forest wealth and its expanding systems of national and state forests, has been slow to advance a community program. Despite the fact that forests in the category have doubled in little more than a decade, their number still is relatively small, around 2,000. Nevertheless, community forests have been under management long enough in this country to yield substantial returns, to demonstrate conclusively that they can and do contribute materially to local welfare and prosperity.

To illustrate merely their economic value, revenue from the sale of merchantable timber from the municipal watershed of Little Falls, New York, which had been established as a community forest, exceeded $20,000. The 36,000-acre forest of Newark, New Jersey, has returned $10,000 to the city from the sale of Christmas trees, lumber and other products. Westfield, Massachusetts, estimates that the income from its 5,800-acre community forest since 1913, including the value of fuelwood distributed to welfare agencies, exceeds $57,000. North Adams, Massachusetts, employs a forester to manage its 3,500 acres of woodland, which in 1943 produced an income of $10,000 for the community. Oneonta, New York, with a forest of 1,212 acres, has been enriched by more than $4,500 a year for the past five years from the sale of timber and fuelwood. Citizens like the idea so much that they have planted more than 660,000 young trees.

County systems of forests, as well as school forests, also are becoming well established. Erie County, New York, for example, has a twelve-unit system totaling 2,531 acres, created for the multiple purpose of timber growing, watershed protection, recreation and wildlife preservation. The 3,700,000 trees planted on these units are already producing revenue, mainly from the sale of Christmas trees. Oneida County, New York, has a twenty-one unit forest on which 4,500,000 trees have been planted. School forests are being developed successfully in the Lake States, notably in Michigan and Wisconsin.

These beginnings, for the most part, were made when this country was at peace, before the insatiable demands of war dipped heavily into both human and natural resources. This means that local needs which brought them about will multiply as the conflict progresses. It follows, therefore, that the area and number of community forests should increase accordingly. This, in principle, is a job for local and regional postwar planners, but the stimulus given the program must spring from the communities—from individuals who see in the land and its intelligent use the greatest hope for a stable and bountiful life after the war.

Some communities are already started upon programs to establish and dedicate their forests as memorials to war heroes. This plan, considering the part community forests can be made to play in the lives of millions of returning war veterans, is inspirational and should have universal appeal. It combines the symbol of freedom, sustained in blood, with the symbol of fruitful living, sustained in wisdom. Let us cherish the opportunity to create out of our hearts and God-given resources monuments — living monuments — to our renewed heritage of life, liberty and the pursuit of happiness.

My Friends, The Hemlocks of Crater Lake

By DORIS PAYNE

THE day on which I first became aware of the mountain hemlocks at Crater Lake was a memorable occasion, chiefly for what developed from it. Surprisingly enough, however, I had visited this place of wonder many times before making their acquaintance. As I look back now, it is not difficult to see why that should be true: I was completely hypnotized by the blueness of the lake itself—a blue of such incredible quality as to seem other-worldly. Only after long association with Crater Lake did my attention detach itself from the obvious and embrace less spectacular features, like the mountain hemlocks, that make up the sum of its loveliness.

Nothing could be more true than that each individual element of this scene makes a unique contribution to the overwhelming effect it produces. Close the eyes to the setting of sheer cliffs from which the sunlight brings out myriad hues, often reproduced in shimmering reflections, and the ever-changing blueness of the water loses much of its power to impress. Eliminate the shadows of drifting clouds or the rippling touch of the breeze, and a large measure of delight is gone. Ignore the contrast presented by the very essence of tranquillity nestled in the heart of a fire-mountain, and one of the lake's most subtle appeals is missed.

With growing appreciation of such features, it is almost inevitable that an eye should be developed for trees and their part in the picture: Trees lining avenues for the vision to follow into the depths of clear water; trees creating a staccato effect as they tuft the semi-distant skyline; trees flowing over the crater rim to form pennants of soft green against a background of rough slopes.

Stimulating as were such perceptions as these, I felt they left something to be desired; a personal touch, perhaps, of which I was only dimly aware until that day when I was introduced by name to the trees most prominent at Crater Lake—*Tsuga mertensiana*, the mountain hemlocks. From that moment, my acquaintance with them continued to ripen until it developed into an almost tangible fellow-feeling. I can best describe the richness and mystery of this experience, I think, by comparing it to the way I once "discovered" a friend.

First there was a steady look in the eyes, a certain way of wearing the clothes, a warm touch of the hand—all outward expressions of an inward something that invited knowing. Then came a pleasurable curiosity, from the satisfaction of which developed a rapport of spirits that suggested the possible nature of further acquaintance. Deepening the sense of companionship were intimate talks at which the flow of thought was permeated by the glow of moonlight or an open fire. On such occasions, the exchange of ideas usually reflected experiences of the past or hinted of aspirations for the future. Thus was formed a friendship that has been kept alive and growing by the interplay of little things aided by the kindly work of time.

Having come, in some such way, to an appreciation of the mountain hemlocks, what could be more natural than my desire to share the joy of that experience?

Even though you've never seen my friends, the mountain hemlocks, you would recognize them instantly by their nodding heads which prompt me affectionately to call them "Lovely Loppy-tops" when we're alone together. They are clothed in feathery, blue-green gowns that are worn with grace and ease. Their early-season wardrobe is accented by fresh touches of silvery-green as new plumes are added. In late summer their shoulders are ornamented with tiny purple cones no longer than your little finger, while in winter they don sparkling robes of white. Not prim, not proud, the hemlocks

"The habitual attitude of hemlocks is that of humility, symbolized by their bowed heads"

are gentle and friendly—traits sharply emphasized by contrast with their frequent companions, the firs. So precise and military in their bearing are these firs that often I find myself inspired to come smartly to attention and salute in passing. Certainly there is that about them which commands respect, symbolizes our aspirations and satisfies our appreciation of symmetry. But always they seem to say "keep your distance"; while the gracious hemlocks invite you hospitably into their family groups.

That they do have family groups is one indication among many of their natural sociability. Seldom will you see a hemlock standing alone. Even when away from the crowded forest, they will be seen in little clusters, nodding and gesturing to one another as if in genial conversation. How often have I noticed, in a small clearing, just one mature hemlock surrounded by a number of sprightly youngsters. Always, on these occasions, the wide-spreading branches of the adult tree, sweeping the ground like a full skirt, never fail to remind me of an old-fashioned mother hovering her brood.

"Trees on the semi-distant skyline—trees flowing over the crater rim to form pennants of soft green against a background of rough slopes"

The truth is that I never think of mountain hemlocks except in strictly feminine terms. In the cloistered atmosphere of winter, their white robes lend them the aspect, chaste and ethereal, of consecrated nuns. Summer, however, brings utter transformation. The young ones, slim and patrician, become imbued with all the grace of ballet dancers. Their older sisters, still with the bloom of youth upon them, suggest the southern belles of colonial days as breezes, swishing through their branches, make a sound like the rustling of taffeta petticoats. And the very old ones, ravaged by time—they are the pioneer women who accompanied adventurous husbands to wild and rugged frontiers.

If you are attracted by these "outward expressions of an inward something that invites knowing" you could hardly fail to find yourself tingling with that "pleasurable curiosity, from the satisfaction of which develops a rapport of spirits." Perhaps it will not be taken amiss if I reveal, from my own experience, a few clues "suggesting the possible nature of further acquaintance."

Open-handed, the mountain hemlocks invite all-comers to find rest on the deep cushion of needles beneath their protective boughs. Deer and bear are often found there and man is equally welcome. Unlike their more masculine partners, the gnarled and twisted whitebark pines, the hemlocks have seen the folly of opposing the elements with unrelenting obstinacy. Instead, they bow humbly before that which they cannot control, only to rise again to full stature when the period of trial is over. Although naturally modest and unassuming, they are bold where boldness is demanded.

These are sweeping generalizations for which I do not ask that you take my word without substantiation by the particular observations upon which they are based. For instance, I have seen a young deer, screened by encircling boughs, rise from its turfy bed to turn questioning eyes upon me; a mother bear with her cubs make for the haven of dense foliage on higher limbs as I approached; the intricate architecture of the tree itself traced on the blueprint of the sky as I lay embraced by the coolness of its shade.

I have seen a whitebark pine and a hemlock growing side by side on a windswept height. Their branches were intertwined like the embrace of an old man and his wife who have borne together, time out of mind, all the troubles of this troublous world. The pine, having pitted itself in stubborn resistance against fate, had been beaten almost prostrate, while the hemlock still looked upward to the source of its pliant strength.

True, even the oldest hemlocks frequently bear witness in the curve at

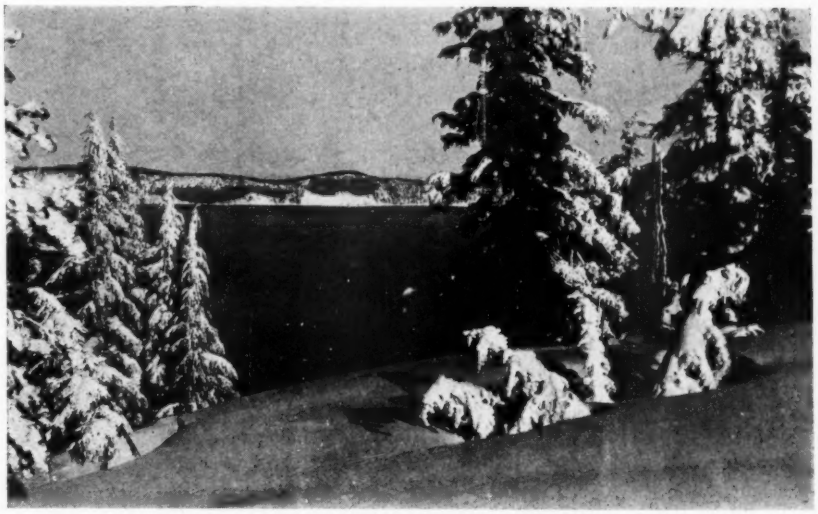
the base of their trunks to winter seasons of travail during which they were prostrated under a crushing weight of snow. But they seemed to know that this, too, like all else, would sometime have an end; that the day would come when their burden would be lifted by the sun. Then, having bowed willingly, they were able once more to will themselves upright. Yet such experiences as these have left their marks, never to be erased as long as life remains.

As to the pioneer courage of hemlocks: Who can deny it, after seeing them, stunted but sturdy, gracing the crest of Garfield Peak at an elevation of over 8,000 feet; or climbing to within a stone's throw of the still more lofty summit of Mt. Scott, as if unwilling to let the pines take all the risk and hardship of high places. Moreover, they are present in great numbers where few other trees have dared to venture—on the precipitous inner walls of the crater rim. There they sink vigorous roots into the clefts of stubborn volcanic rock, into shifting pumice, into rubble left by glaciers, heroically determined to stay the forces of destruction bent upon breaking down the walls and tumbling them into the lake.

In their determination, the hemlocks often pay an astounding price for their refusal to let the agents of destruction have their way. Of this there is ample evidence even on the short walk along the trail from the rim to the water's edge.

"Witness to early days of prostrating snows, are the curved trunks"

Here, supporting on its knees a huge boulder salvaged from a landslide, is a tree with its lower portion battered, scarred and bare of bark. There, another hemlock appears to be fighting a losing battle against the rush of snow waters that have undermined the tree's precarious foundation and left vital roots exposed in midair. Nevertheless, with needles from its sweeping branches, this veteran hopefully thatches the ground each year in an effort to hinder the waters from carrying away the soil. Here and there are other trees that, even though toppled in death, still keep an unrelenting grip upon the larger rocks about which their roots are grimly clasped.



"In winter they don sparkling robes of white — in aspect chaste and ethereal"

Thus do the mountain hemlocks symbolize for us the rugged qualities of stoic endurance in devotion to a cause. But our appreciation of them need not stop there, for as our sense of companionship with them deepens, new vistas are thrown wide—vistas that "reflect experiences of the past or hint of aspirations for the future." It is as if the trees and their surroundings as we see them today were but one frame in a serialized motion picture the first installment of which appeared so long ago as to escape the memory of man, and the end of which will be revealed in a future so remote as to defy prediction. From what we do know, however, the events that took place in the dim past can be reconstructed with a high degree of accuracy.

For our purposes, we may pick up the thread of the story at the point reached about 5,000 years ago when Mt. Mazama, the lofty volcano on which lived the ancestors of these trees, met its doom. Always it had been restless with internal fires which at last were its undoing. Cataclysmic was that day when quaking and rumbling heralded a raging outburst of temper during which the "devil-mountain" hurled forth molten rock in vast quantities. Some of this gas-charged mass boiled in fiery avalanches down the mountainside. Some was carried by the wind to distant places. So great was the void left within that the very foundations of the peak were undermined. To the accompaniment of thunderous roaring and crashing the proud summit collapsed into a seemingly bottomless abyss.

On the raw, precipitous sides of the resulting cauldron was no foothold for the hemlocks, eager though they were to heal and hide the ugly scars remaining.

(*Turn to page* 415)

"Surrounded by youngsters, like a mother hovering over her brood"

"Les Landes" . .

Where Over Three-Quarters of a Cent Fran
Dunes and Waste Marsh La nto

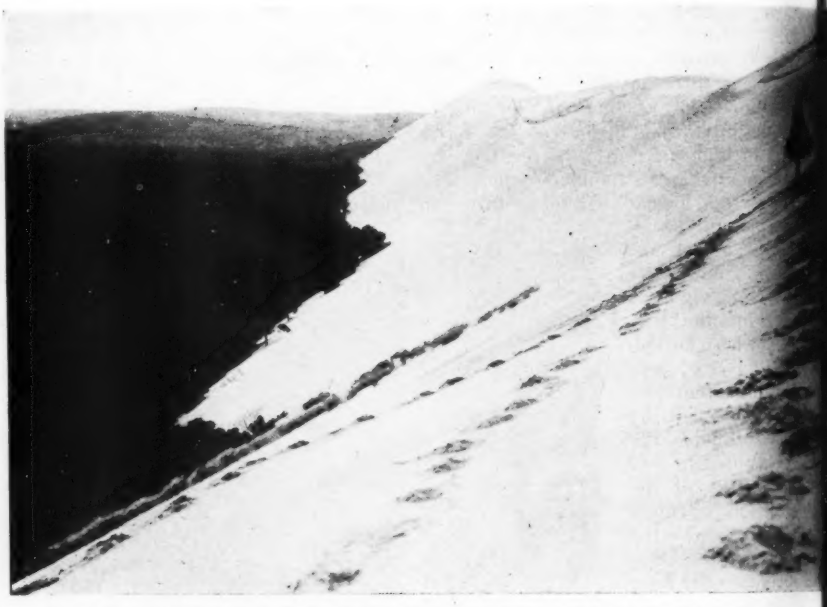
Reports reaching this country through the French underground leave little doubt but that the Nazis are dealing harshly with the famous maritime pine forests of Les Landes, *the fascinating story of which is presented here by Dr. Walter C. Lowdermilk, distinguished chief of the Division of Research, U. S. Soil Conservation Service.*

According to these reports, practically all trees along the coast have been felled in the building of the southern end of Hitler's "Atlantic Wall." Interior forests have fared somewhat better, though cutting has been particularly heavy along railroads and highways. The best estimate is that the Nazis already have removed or destroyed timber in excess of the amount the French would have harvested in the next thirty years.—Editor.

THE transformation in southwestern France of a vast, desolate "moist Sahara" of invading sand dunes and pestilential marshes into rich producing areas, is a classic in land conservation. This region, known as *Les Landes*, was once the great sore spot of the nation, where dwelt poverty, malnutrition, disease and despair. It has been transformed into beautiful forests where, prior to the war, abounded pleasure resorts, health centers and flourishing populations with assurance of life, culture, and prosperity for the future. The vast annual revenues from the production of timber and resin alone made this one of the rich areas of France. Financially the work has paid for itself many times over.

The two major problems involved were, first, the planting and fixation of 400,000 acres, an ominous white sea of shifting sand dunes along the coast, and second, the draining and afforesting of *Les Landes*, or waste flat marsh lands extending far into the interior, and separated from the ocean by the mountain waves of sand.

Prior to the last part of the eighteenth century when the first large-scale attempts at reclamation were begun, the coast of Gascony, from the mouth of the Gironde River to the rocks of Biarritz, was being invaded by the ever-rolling sand dunes at the rate of sixty-five feet a year. Often reaching heights of 175 to 300 feet, these bleak mountains of sand covered an area three to five miles wide and 150 miles long. Driven by strong west winds and tempests, they advanced ever eastward into the interior flat lands, relentlessly covering villages, forests and fields. Besides the immediate damage, the sand dunes acted as dykes which dammed up natural outlets to the ocean of streams and rivers. This caused the accumulated waters to form huge lakes and unhealthy marshes. Two and a quarter million acres were affected. Of this, more than 1,625,000 acres



This great dune was left untamed as a reminder of the desolation that once existed. It is swallowing up the forest at the rate of five feet a month

Once the scene of disease, poverty and despair, pine forests such as this brought health, wealth and a future to the southwestern coast of France

By WALTER C. LOWDERMILK

France Has Transformed Vast, Mobile Sand Into Rich Pine Producing Areas

Before the waste lands were reclaimed, shepherds herded their meagre flocks by the aid of stilts. "Les Landes" was then a region of fever, pestilence and death

How the advance of the sand was checked—the littoral dune fixed with a plantation of gourbet grass as an intermediate step to planting with pine

were like an interior Sahara in a moist climate, which somehow had to be drained and afforested.

The history of the sand dunes doubtless begins with the Ice Age. During the pluvial period which followed, they were covered naturally with vegetation, largely maritime pine. Just when the region was first occupied by man is not known, but by 600 B.C. some of the dunes had become a menace to ancient Gauls who had settled in the basin of d'Arcachon. Their capital was Boiens. It is not known whether or how they disturbed the natural vegetation on these ancient dunes, but the capital city became so menaced by encroaching sand that the Gauls sought to profit by the example of nature and fix the dunes with seedlings of natural vegetation. All about them were immense forested areas, on the ancient dunes as well as covering the flat inland plains. From these resin-producing maritime forests, the Gauls carried on active commerce with the Romans who called them "Piccos" or "Resin Producers".

In 407 A.D. the Vandals invaded this region and destroyed everything in their path, including the sand dunes fixation work which the ancient Gauls had accomplished around Boiens. There remained only the great forest of La Teste and the little forest of d'Arcachon. The dunes, thus abandoned, began to grow and multiply and move inland. These new dunes, called modern dunes, have covered more than 400,000 acres between the ocean and the ancient forested dunes.

The Gauls who had escaped the barbarians again had to flee—this time before the encroaching sand. Leaving Boiens, they founded a new city called Cap-de-Buch. As this city in turn appeared to be imperiled, they again began new seedings, but in the end man was defeated. Fleeing once again, they built La Teste-de-Buch, but by the end of the fifteenth century this city, too, began to be covered.

Devastation increased, and near the end of the eighteenth century conditions became tragic. This vast area of 2,250,000 acres was considered almost without value. The former resin-producing forests of *Les Landes* were practically gone, destroyed partly by dunes and partly by the formation of numerous marshes, as uninhabitable as an immense desert. There were no springs; briars, broom and bracken were the only traces of vegetation. In winter, great areas were flooded and became fever infested marshes.

The few remaining hamlets were separated by these marshes and by stretches of desolation almost equaling that of the adjoining sand dune lands. The only drinking water was from a shallow wa-

ter table—acrid, stagnant and yellowish in color, and impregnated with surface germs. The death rate was appalling. The people were ill with malaria—then called intermittent fever—and undernourished from meager returns of cultivation and the products of the flocks which found scanty forage. The herders derived their grazing rights from the thirteenth century and still attempted to maintain this method of livelihood, even though the shepherds had to herd their flocks by the aid of stilts. When at rest, their staff was used as a third stilt to form a tripod on which they sat, clothed in sheep skins, and knitted their coarse wool. Their houses were badly built with thatch walls of dried broom. There was no stone and very little wood for construction. Poverty, disease and despair reigned supreme.

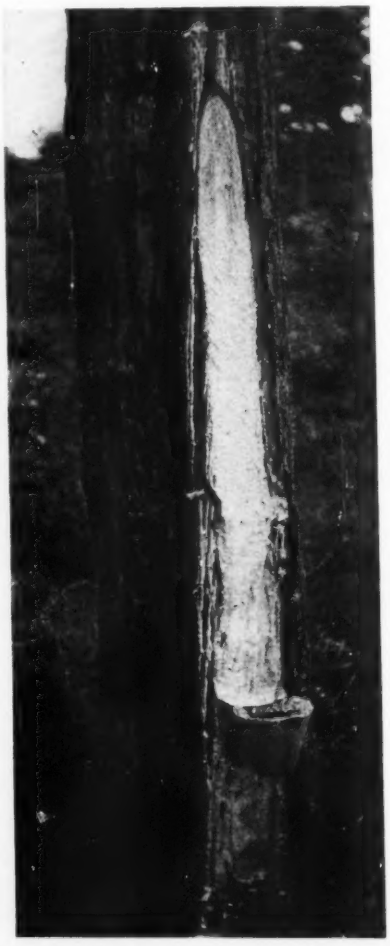
This unbearable situation could not continue. Many individual and collective attempts at reclamation had been without avail. Suggestions were endless, but it was first necessary to convince the communes and private owners of their feasibility. In 1774, the Abby Desbiey read a paper before the Academy of Bordeaux, stating how the sand dunes might be checked by imitation of the action of nature through growing maritime pines. Four years later Villiers was appointed to study the creation of a military port in d'Arcachon. He recognized it was first necessary to conquer the movement of the dunes and presented the principle of "dune fixation".

Napoleon, in 1786, appointed his famous engineer, Bremontier, to attack this problem of dune fixation. Bremontier sowed maritime pine seed on the dunes and covered the planted areas with branches. This was to protest the young seedlings from being blown away or cut off by the saw-like action of moving sand. His perseverance overcame many obstacles and proved that this project could be successful. Unfortunately, these works were interrupted during the French Revolution, but in 1801 the new government prescribed that the dunes of Gascony be fixed and planted to forests.

This work was first placed under a "Commission of Dunes for Gironde", then transferred to a commission for *Les Landes*, consisting of all waste lands of the area, both marshes and dunes. In 1817, the authority passed to the Service of Bridges and Roads and, in 1862, to the Bureau of Waters and Forests.

Fixation of sand dunes, begun in small areas in 1787, may be said to have been completed in 1865. The method used was a composite of experience and observation. The work was first begun on the east for protection of the villages. Three difficulties had to be overcome: (1) The covering of the seed plantations by dunes, (2) the scattering of seed by wind, and (3) the covering of seed with sand moving at the surface.

The first danger was avoided by selecting depressions, called "lettes", between dunes that were large enough for the forests to develop before the dunes could cross them. Against the second danger, the sand was covered with green branches of pine and broom to protect the seed from the wind. No special treatment was given the soil. To each



The pines have yielded enough resin to pay for all reclamation work

acre eighteen to twenty-two pounds of maritime pine (*Pinus maritimia*) seed, eight pounds of broom seed and five pounds of gourbet seed, a coarse grass, were sown. Then branches were laid shingle fashion over the dunes in rows from east to west, with the butt ends toward the west, from which direction the sand rolled. It was necessary to use from 200 to 400 branches, averaging about forty pounds each, or 40,000 pounds to an acre. The branches were then lightly covered with a layer of sand to weight them.

Against the third danger, another system of defense was used. Palisades and clayonnage, running generally north and south, were constructed parallel to the coast. The palisades were made of eight-inch pine boards five feet long and one and a quarter inches thick. These were driven into the ground about two feet apart. The sands blown by the west winds piled up against the palisades and filtered through the open spaces. When the boards were covered they were raised by means of a lever or jack. Palisades were sometimes replaced with a more economical clayonnage of pickets, four and a half feet long, driven eighteen inches into the sand, and spaced one and a half feet apart. These were interlaced with bundles of fagots at the rate of 400 pounds for each 300 feet. In the shore zone which was most exposed to the action of the wind and sand, only gourbet grass seed were sown, at the rate of twenty pounds to an acre.

It was necessary to construct a littoral dune on the ocean front to hold the plague of new sand which the sea was daily casting up from the sorted silts carried out to sea by the Gironde River, and thereby protect the young forests and works. In order to produce the formation of this dune, a system of palisades and clayonnage works was constructed from 300 to 600 feet back of the high tide level. In concave areas the dune was planted closely — eight inches apart — with bunches of gourbet coarse grass, to collect the sand. On convex surfaces, the grass was planted two and a half feet apart to allow for some leveling movement of the sand. Gradually, of course, grass covered the dune, greatly retarding sand movement.

Exposed to accidents of blow-outs and the lashing of the sea, the littoral dune had to be maintained constantly. When breaks occurred networks of fagots were driven into the ground. Sometimes, in accordance with the extent of the damage, as many as three or four rows were needed. These were placed in quincunx spacing of one and a half feet. When the breaks were smoothed out they were crested or covered with gourbet grass.

Fixation of sand dunes was but half the problem of reclamation of the 2,250,000 acres of waste lands. The damage caused by sand obstructions to the former drainage of rivers and surface waters to the ocean still continued, for there were few channels through the dunes to the sea. Thus all accumulated waters backed far up into *Les Landes*, forming enormous inundated areas during winter months. In 1837, the Agricultural Society of d'Arcachon expended several millions of francs for reclamation work on 50,000 acres of marsh land. The project failed, discouraging

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WHAT DEER EAT

By Species, by Season, by Range and by Preference

By ARTHUR HAWTHORNE CARHART

DEER eat lettuce; they love it. They eat green peas with gusto. Near Manitou, Colorado, they have tiptoed daintily into tulip beds and have feasted on the flowers. Just because they occasionally invade gardens and are seen eating vegetables and posies doesn't mean that is good deer pasture. We would accept that without much proof. But what is good roast beef, mashed potatoes, salad and pie for the deer family? The game management men and lovers of all outdoors would like to know.

When a crew of young, college trained men took the field under my leadership a few seasons ago, to determine what constitutes a good range for a herd we asked many questions. We received many answers; some of them partially true. There were conflicting statements and the one way we saw to reach the truth was to assemble a sufficient volume of exact data on which we might base sound conclusions. That is what we did.

These studies in Colorado were systematic. We established plots measuring a fraction of an acre where only deer were grazing and periodically checked forage eaten from these plots. We adopted "snow trailing" as another means of securing facts. A man would follow the tracks left by a grazing deer and tabulate the number of fresh clips of food that deer had taken from bushes along the way, recording this information by percentages based on untouched twigs on other parts of the shrub. We engaged in some straight observation and found it the least accurate of several methods used.

The most exact and positive data were secured from a series of samples taken from deer stomachs. These specimens were picked up during hunting season, from kills made by predators, from remains left by poachers, and where there were such numbers of deer that removal of a few for this scientific work actually would benefit those animals remaining, the field crew collected specimens. Whenever this was done, there was no waste of the venison, for it was delivered to the nearest community and distributed to the needy.

Between 500 and 600 individual deer diets were recorded by the snow-trailing and stomach contents methods in three seasons. The data were secured in a number of different types of ranges, in various parts of Colorado, at each season. By both numbers and spread of data, we know the averages represent what western deer eat, by season, by range, forage species and by preference. While these investigations were limited to a single state, and to the Rocky Moun-

Deer require 150 pounds of forage a month—difficult to get in winter when the snow is deep

tain mule deer species, and give an exact picture of their diet, they cannot be exact in application except in similar areas of the West. But they do indicate what all deer of all states are more likely to prefer as food.

We found what might be termed "herd habit" in the forage species eaten. In the dead of winter, near Sapinero, deer dug under a foot of snow to reach a species of small rabbitbrush. A hundred miles away, on a similar range, they ignored this plant. This held true with regard to the use of other forage species. We speculated on why this happened, as soil and forage tests showed no material difference in nutrient values of the plants

come from shrubs. They vary their diet as people do, in proportion to the foods available, and under pressure will eat and subsist on materials they do not prefer. But if given any preference at all, they browse.

Another unsuspected fact is the speed with which the diet of a deer shifts during the seasons. In a certain period of May, where it was abundant, the deer ate a high percentage of snowberry twigs. Within a matter of hours, they shifted to scrub oak. In early June there was an abrupt change from the oak to serviceberry. Only because we were working on a systematic basis, covering all ranges and all seasons, were we able to

Systematic studies eliminate guesswork. For instance, these cedar branches were stripped by rubbing velvet from horns not, as some might think, by browsing

on various ranges. One guess was based on the fact that as a fawn is taught to eat by its mother, she directs it to what her mother taught her was good food. Thus a "habit" was formed just as youngsters of Italy learn to eat spaghetti, little fellows in Mexico learn to like chili and children in this country become acquainted with apple pie. We have no better answer to explain this behavior.

We were surprised at the relatively small amount of grass and grass-like forage our deer eat. We had been told grass was high in the scale of deer food preferences. We know now that is an error. Deer will eat grass, especially in the spring, but if other types of food are at hand they use very little of it in other seasons.

Deer browse. Their principal foods get this interesting knowledge. It is important, too.

An observer in the field for a limited time might find the high use of snowberry and conclude it must constitute a large part of deer food throughout the entire spring. But then he might move on, satisfied that he has the answer to what made up a principal spring food for deer. Within a day or two, the deer might abandon snowberry and turn to scrub oak. By some foresight and sheer luck, our studies were inclusive enough to demonstrate these sudden shifts and give us a complete diagram, including these abrupt changes from one food to another.

One more point should be explained before detailing what we found our deer to eat. We always took what we termed a "range analysis" as each individual deer study was made. We tabulated, by percentages, all of the potential forages present. Having this, knowing what was "on the table," we were able to compare what a deer might have eaten with what it did eat. There again we found we had been guessing badly, for deer are highly selective, generally making most of their diet on from four to six forage species. Even where as many as twenty-five or thirty potential foods were at hand, their food supply rested on a very limited group within the total.

After we had secured our data sheets from the field and laboratory, our calculating machine was put to work. The sheets averaged three to each record of an individual deer's eating preferences, and each sheet contained from twenty-five to fifty individual figures.

In this order, we found the spring preferences of the average deer on a typical Colorado range were big sagebrush, serviceberry, grasses, weeds, snowberry, and, surprisingly, pinyon pine. Out of from thirty to forty potential forages available, the deer were eating fourteen, but the six named made up eighty-five percent of their diet. This was the highest period of grass use, yet it represented only twelve percent of the total deer diet. And that use occurred in a very limited period—just as the new grass shoots made tender salads. Within three weeks of the three spring months, the deer ate more grass than they did all the other weeks of the year combined.

By summer the menu had changed; the big demand was for serviceberry. This shrub and its fruits made up fifty-four percent of the summer deer diet, including some ranges where it was not too abundant. Chokecherry, with nineteen and a half percent, was second, and scrub oak was third, standing at twelve and a half percent. The deer were feeding on ten plants, out of an abundant variety, but the three named made up eighty-six percent of their diet. Grass was eaten, but it amounted to only a third of one percent of the deer food. And, make no mistake, there were tons of grass available.

In the autumn, there is a greater distribution of choice among the many plants that deer might eat. Serviceberry, big sagebrush and mountainmahogany formed the bulk of the food, but these represented only forty-five percent of the total diet. Rabbitbrush, aspen, pinyon pine, myrtle boxleaf, scrub oak, bitterbrush and what we call Oregongrape, but more exactly named hollygrape, were other principal foods. Grasses were slightly less than a third of one percent of the diet.

When winter comes, on many of our western ranges, the big sagebrush is the

most used food. On all ranges it represents over a third of the average diet, but in some spots where it is the predominantly available food, individual deer were found to have eaten over ninety percent of their diet from the sage. Where other foods were available, it formed only a modest fourth, fifth, or sixth of the total diet.

Winter is the critical period for game on the range. Snow conditions narrow available foods to a dozen or so species. After big sagebrush, pinyon pine, juniper, rabbitbrush, serviceberry and mountainmahogany were used in the order stated. These six trees and shrubs made up over ninety-three percent of the diet in winter; grass stood at one-half of one percent of the total.

One of the other surprises that jumped at us out of the facts was the use of evergreens in winter. The pinyon pine is a resinous tree, in the yellow pine group, and without our data we might never have suspected its importance as food; a fifth of the winter deer diet came from it. The junipers, types closely related to the eastern redcedar, supplied fourteen percent of the diet. Thirty-five percent of our western deer's winter diet proved to be these two species of resinous evergreens!

When we had made all our summaries still another fact rose up to nod its head. There were certain plants, far from abundant in any section, that deer sought out. They ate them many times over their relative availability. Two in particular were in this class—the hollygrape and the myrtle boxleaf. We have two guesses as to why this happens: Either they are the deer's "candy bars" or they are very important in aiding the assimilation of other forages the deer have eaten. Science some day probably will find that both guesses are wrong!

The facts so gathered, summarized and analysed cannot be applied to other deer species in other areas except in a general way. But they give a pattern of what deer will feed on; the *types* of forage they will use. The truths we found did explode a lot of bad guesses by local residents and even those naturalists who had studied deer food requirements within a limited area for limited periods.

Such facts are interesting, but represent no advance in wildlife management unless put to use. We did that. We devised a method for "weighing" the deer forage available on a winter range; the food supply that could be used in that critical season.

Obviously, we could not cut the browse, load it on a truck, and put it on a hay scales. But we clipped many hundreds of representative measured plots that gave a cross-section of what was on a range. The cuttings were separated by species and air-dried to eliminate the factor of variable moisture content. These plots were a fraction of an acre, and by multiplying the average of a whole series of plots we arrived at an approximate average of pounds of available browse an acre over the whole range. This by no means is accurate to the last pound, but our figures probably approached the accuracy found in measuring across a stack of hay and computing tonnage by such measurements. Furthermore, knowing what deer actually would eat, our computations were based on known deer foods, not on all the forages present.

We had made reasonably accurate counts of deer on the important ranges. We knew how many animals were there. We also had excellent data from experimental work done elsewhere on which to base requirements of deer in terms of air-dry forage per day. Using all of this data, which showed a remarkable agreement in findings, we arrived at a figure of four and three-quarters pounds of air-dry forage a day as a sustaining ration for a 200-pound deer. To provide a slight margin, we used five pounds as the individual animal requirement.

By simple arithmetic: A deer requires 150 pounds of forage a month, 900 pounds if it feeds on a range for six months; therefore, if we had 9,000,000 pounds of deer forage on a given range we could support 10,000 head of deer for half a year without damage to the forage resources. We could direct hunting harvest to ranges threatened with overstocking, or ease the pressure where the game population was definitely below the carrying capacity of the range. We were able to resort to cold figures whenever charges might be made that game uses on a range were interfering with the production of domestic stock on the same area.

This is the pattern of sound wildlife management.

In years gone by, much of our knowledge of friends of the wildlands has been fragmentary, inevitably incomplete and sometimes in error. In the few years before the war, the Pittman-Robertson Act for wildlife restoration opened the door to many studies such as this one conducted as part of the Colorado program.

As we started our work, we made many guesses as to what deer ate. Now we know what they eat on a typical Rocky Mountain area; by species, by season, by percentages, by preference. It took long days and miles during snow and sunshine; it involved the taking of a moderate number of animals from high population areas for scientific study; it included pages and pages of paper work and calculations. But the knowledge gained beyond mere interest in the findings provides a solid foundation for intelligent deer management on many western areas. We need guess no longer; we know what deer eat.

Big sagebrush ranks first among western deer food preferences in the spring—and during the critical winter period it is the most useful food on many ranges

Pale green is *Sphagnum squarrosum*, shown here one-half larger than its natural size

Green Gardens

By DEVEREUX BUTCHER

Strikingly Beautiful in Form and Color are Our Woodland Mosses, Soil Builders and Conservers

WHEN viewed at close range, moss no longer appears to be a mere mat. Aided by photographic lenses in the accompanying pictures, some of the individual moss plants are shown greatly enlarged—an array of strikingly beautiful vegetative forms.

Small though the moss plants are, their species and varieties in this country number a thousand or more. In some instances the difference between species is so slight as to be indistinguishable without a microscope. The distribution of moss is wide, for it is found from sea level to far above timberline, and from the frozen north to the humid tropics. It grows in deep forests where light is insufficient for most other small plants, and on cliffs too sheer for larger plants to find a possible roothold.

Shown in the picture above is *Sphagnum squarrosum*, the moss with unusually large plants. Photographed in a typical boggy site high amid the mountains of Acadia National Park, Maine, it is pale green—one of the most beautiful of all mosses. The members of the *sphag-*

***Catharinea undulata*, pictured twice its natural size, was named in honor of Empress Catharine II of Russia**

num group are many, and some of them are bright pink or orange.

During the course of years the *sphagnums* build a soil known as peat, and it is because of this that they are frequently called peat mosses. Their plants are able to hold two hundred times their own weight in water. Dry sphagnum is extremely absorbent, and this quality together with its extreme softness, makes it suitable for use in bandages. Florists and nurserymen use *sphagnum* as packing material for plants in shipment.

Catharinea undulata, shown at right, was also photographed in Maine. It is common along shady stream banks and on wooded slopes in temperate North America, particularly in the East. The name *Catharinea* was given the genus by the botanist Fredrich Ehrhart in honor of the Empress Catharine II of Russia.

Aulacomium heterostichum, one of two species comprising the genus, is a small moss that inhabits rich, moist woodland soil, frequently at the base of trees or on rocky, shady slopes. Shown below, its range extends westward from the Atlantic Coast to Wisconsin and south to Texas. Growing from the plants of this moss are its fruiting capsules.

On the following page is a picture of *Nekera pennata*, the moss with slender, tapering fronds, taken in the Olympic rain forest of Washington. Clothing the base of a giant western redcedar, this brilliant moss inhabits an area ideal for moss growth, for here on the Pacific slopes of the Olympic Mountains the climate is mild and the rainfall averages 125 inches a year. This, like *Aulacomium heterostichum*, has its fruiting capsules present. Each one of these capsules contains hundreds of microscopic spores — and spores to a moss are what seeds are to other plants, providing the usual means by which most mosses propagate.

With its fruiting stalks *Aulacomnium heterostichum*, shown twice natural size, is outstandingly beautiful

When a capsule is ripe, the spores are discharged and carried by the wind. Alighting in favorable environment such as moist soil, a spore germinates by sending out a green web-like filament called a protonema. This grows and branches rapidly, and from its many stands buds eventually sprout and develop into new plants.

The mature plant may possess either or both the archegonium, which contains cells from which the capsule arises, and the antheridium, containing antherozoides which, during wet weather, transport themselves to the archegonium for the purpose of fertilizing it and developing a new spore capsule.

Another method by which mosses propagate, and upon which some species depend almost entirely for the continuance of their kinds, is the breaking off

Plants of *Mnium affine celiare* resemble flowers. They are shown twice natural size along with vine-like sterile portions of the species

in dry weather of bits of the plants. Coming in contact with moist soil or other favorable environment, these grow a web of protonema and thus start a new colony of plants.

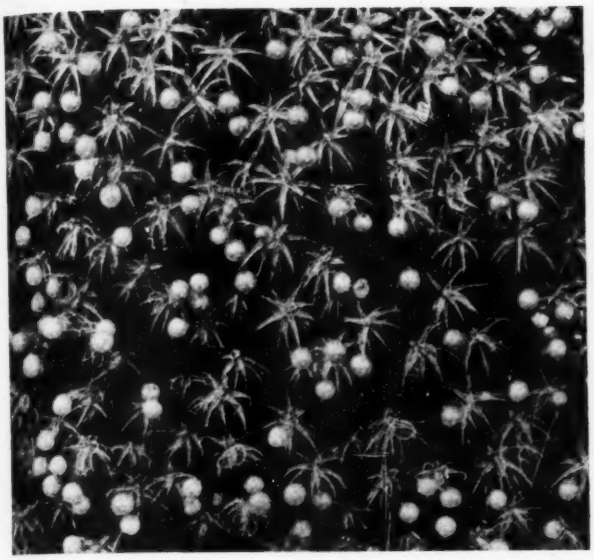
Moist ground or rock is the habitat of *Bryum bimum*, shown on the opposite page. This moss was photographed at the base of a dripping cliff in the Delaware River Valley, Bucks County, Pennsylvania. The *Bryums* as a group are difficult to identify. The genus is very large, having several hundred species that are broadly distributed. Adding further difficulty to their identification, the *Bryums* closely resemble the *Mniums*, shown above, though in most instances the latter have larger leaves. The chief characteristics, distinguishable only with a microscope, are the longer, narrower cells in the *Bryum* leaves.

To anyone accustomed to walk in the woods, the white or pincushion moss, *Leucobryum glaucum*, is a familiar sight. Always growing in pale green island-like mounds, it prefers moist soil, but is often found on drier sites. The picture, shown on the opposite page, shows a portion of the edge of an unusually large mound of which the plants are so closely arranged that they resemble fur. *Glaucum*, the second half of the scientific name, comes from a Latin word *glaucus* which means "coated with a whitish bloom," and refers to the pale color which is a striking characteristic of the species.

The outstanding feature of *Bartramia pomiformis* is its globe-like or apple-shaped capsules. *Hylocomium splendens*, commonly called mountain fern moss, has fern-like fronds, inhabits damp forests. Both of these mosses are pictured on the opposite page.

Because of their power to grow rapidly and to cover exposed earth, moss aids in preventing soil erosion and in checking water run-off, thus contributing toward the prevention of floods. They also have the power to create soil where none has existed. This is done in widely differing locations as on rocky out-

Of distinct character are tapering pale green forms of *Nekera pennata* (below) shown with its fruiting stalks at about natural size



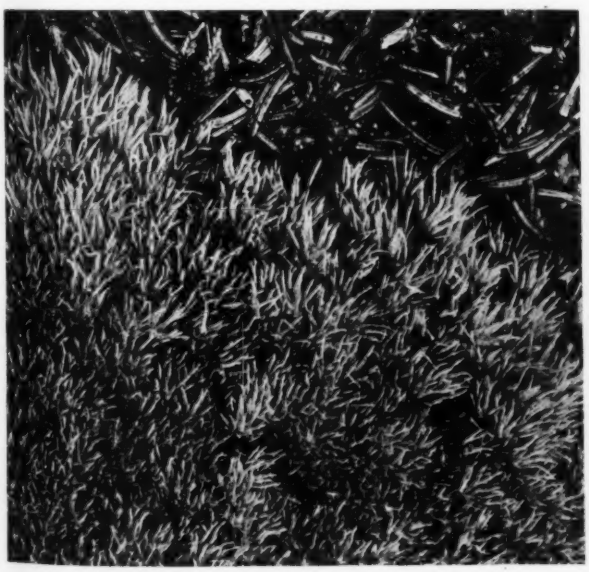
Globe-like or apple-shaped capsules are an outstanding feature of the species *Bartramia pomiformis*

Commonly called mountain fern moss, *Hylocomium splendens*, shown twice its natural size, has fern-like fronds

crops and in bogs, and is accomplished by the dying of old plants which, through accumulation and decay, eventually lay down a layer of humus. Through this process the mosses are actually pioneering and preparing the way for larger forms of plant life.

Mosses are apt to be most abundant along the banks of woodland streams, but they can be found nearly anywhere, and many species will be encountered during a stroll in the country. The next time you are out, take a few plants from each kind of moss you discover. When you reach home the number of plants you have collected will surprise you. For further interest, soak and wash the specimens well in clear water, and then view them through a magnifying glass or hand lens.

Aside from an appreciative glance at the verdant effect produced by mosses on the forest landscape, most people pay little or no attention to them. This is pretty generally true even of the amateur nature enthusiast who may spend leisure hours observing and identifying the more conspicuous forms of nature such as wildflowers, birds and trees. A student of nature knows that a little knowledge of these things adds to enjoyment of the out-of-doors. To be able to recognize and name the more common mosses will add just that much more to this enjoyment. Books on mosses are to be had, and these, together with a fairly high-powered hand lens, will start the beginner on a new path of nature exploration; and because identification of mosses is difficult, their study brings a distinct satisfaction each time the name of a new species is determined.



***Leucobryum glaucum*, the white or pincushion moss, is a common woodland species. Portion of large mound is shown**

***Bryum bimum*, shown three times its natural size, is so small in life that its star-like forms are hardly apparent**

FORESTRY BY FREE ENTERPRISE

Practical Land Management Policy of Oneida County, Wisconsin, Designed to Play Important Role in the Economic and Social Pattern of Rural Communities

By E. S. HURD

ONEIDA COUNTY, Wisconsin, the first county in the nation to pass a land zoning ordinance, has found the answer of what to do with its tax reverted cutover lands. Within the past two years approximately 100,000 acres of delinquent lands have been sold to three paper companies which plan to rebuild and develop the areas under a long range forestry program. With the consummation of these acquisitions by private industry, it is believed that Oneida exceeds all other counties in the Lake States region in the amount of privately owned cutover land included under well defined programs to provide forests for the future.

The decision of county officials to sell these lands was not accomplished without debate and heated argument. Some members of the county board questioned the advisability of such sales, reasoning that if private industry could practice forestry on these lands, presumably at a profit, then why couldn't the county do likewise?

After the smoke of verbal battle had cleared there remained this dominant thought: Regardless of the integrity of a group of county officials, there would in the future probably be some factions not wholly sympathetic to a county forestry program, and which might railroad the whole development into oblivion. It seemed logical, therefore, to the majority of board members that private enterprise might better administer a program of forest rebuilding than would an elective county organization.

These county lands have been purchased by the Nekoosa-Edwards Paper Company, the Consolidated Water Power & Paper Company and the Tomahawk Kraft Paper Company. In addition, the Rhinelander Paper Company has purchased a block of privately owned land within the county, which is to be used in producing forest crops.

The program of the Nekoosa-Edwards Company was launched back in 1926, almost a decade before the "Tree Farm" movement gained prominence on the West Coast. It was the first paper company in the state to launch a forestry program. Shortly thereafter, the Tomahawk and Consolidated companies started on a similar venture of acquiring and rebuilding cutover forests. Today, forestry lands owned by these three companies total 260,000 acres. All are actively engaged in reforestation projects,

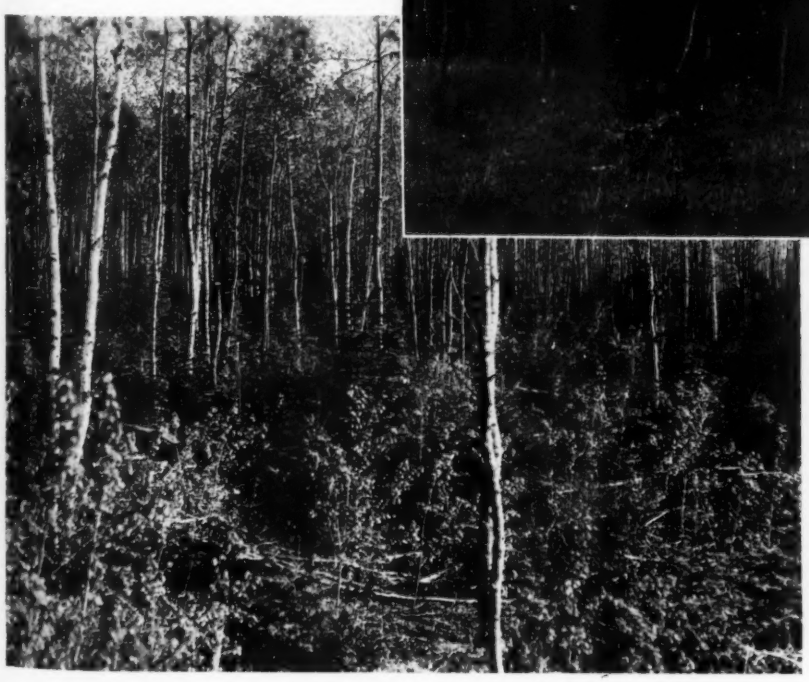
In selling tax reverted cutover lands to private industry for long-range forestry programs, Oneida County visions multiple land use development—timber for the pulp mills, water for industry and recreation

two maintaining their own forest nurseries. Approximately 30,000 acres have been planted. With the recent acquisition of lands in Oneida County, plans will be advanced to continue planting operations as a part of the program to rehabilitate the forests.

The positive action taken by the paper companies in purchasing large blocks of cut-over forests created some doubts in the minds of suspecting individuals. The motive of the companies in acquiring these lands was so practical that many persons viewed the whole movement with skepticism. They were accused of being land pirates bent on creating glorified hunting preserves or skinning the forests of what little pulpwood that remained and dumping the lands back onto the county. Their only purpose, however, was to rebuild the forests and by so doing provide a source of local raw materials. The economics of the paper industry does not lend itself to the wanderlust which often has characterized the lumber industry. Paper mills are not dismantled and shipped to new territories with the same abandon that has been the case with many sawmills. Because of this deep-rooting, the paper companies have been required to extend their supply lines and, as some are doing, to produce their own domestic crops for future use.

The cutover lands of Oneida, as well as other northern Wisconsin counties, possess certain silvical advantages for pulp crops. A recent study of the county revealed that eighty-seven percent of the forest area consisted of restocking stands, varying from one to twenty-five

When ghost towns began to appear, the county, through default of tax payments, found that it was in the land business—mostly cutover barrens



The solution was to return the land to private enterprise—to paper companies already launched upon a program of forest rebuilding. Some were establishing plantations, as the jack pine stand shown above—all could see a future in the young forests coming back, such as the aspen stand with balsam and spruce understory shown at left. Eighty-five percent of the forest area of Oneida County is comprised of young, immature stands

years of age. While twelve percent of the area contains cordwood stands, mature sawlog forests occupy only one percent. Furthermore, the type composition of these lands is comprised of about three-quarters potential pulp species, with the remaining quarter in hardwood and non-pulp species.

While it is true that a greater part of these pulp stands are composed of aspen and birch, these pioneer species which clothed the lands following burning are utilized for pulp, and are highly desirable as cover crops for the more site demanding species. The lowly aspen, which only a decade ago was considered a worthless weed species, has become increasingly important to the paper as well as other wood-using industries in the Lake States. With these lands so largely dominated by young stands and restocking to pulp species, it is readily understood why they are to be managed as pulpwood forests rather than for sawlogs. On most sites it will be possible to harvest from three to five crops of pulpwood in the time required for one rotation of sawlog timber.

Not only is the county's program restoring lands to its tax rolls, but operations by the companies provide employment for off-season farm labor

Removing mature aspen in pole lengths for pulpwood. Partial release cutting such as this will improve the residual stand of immature hardwoods

The history of land use and abuse in Oneida County is a counterpart of the same experiences common to most all other counties within the northern cutover region. The timber was harvested under the "cut out and get out" policy with no immediate concern given to the future. During the peak of the lumber industry, these counties realized sufficient tax revenues from the lumbering interests to meet their current needs and, in some instances, to splurge a bit. No one became too alarmed over the time when the timber would be gone, for it was generally assumed that there was plenty more just over the hill. Furthermore, it was commonly believed that logging operations were decidedly beneficial, for the ax cleared the way for the plow which was to follow. During the heyday of the white pine era, the lumber companies located at Rhinelander, the county seat, felled over 700,000,000 feet of timber in a year, thus exploiting a resource, but nevertheless contributing to the lumber demands of an expanding nation.

The peak of lumber production in Oneida County was reached about 1900. Following logging, the debris was cleared and burned thereby making way for farming and dairying which were proclaimed to be the salvation for this new frontier. However, a few warnings were voiced as to the dangers of attempting to convert every acre of slashing into productive farmland. Filibert Roth, reporting on the general forest conditions of northern Wisconsin in 1898, estimated that at least sixty-five percent of Oneida County was strictly non-agricultural in character. But Roth's was a voice crying in the wilderness, and land clearing increased in tempo. The lumber industry continued and it was their taxes which paid for the new roads, the new schools and other cultural marks prevalent in the new farming communities.

Just prior to 1914, the State of Wisconsin acquired some land in Oneida and adjoining counties for a project of "forestry and reforestation." The board of supervisors of Oneida could visualize no particular merit in such foolish efforts to restore the forests, and went on record in vigorous protest against continuation of the project. The board further insisted that such areas might better be opened to the public for settlement and permit agricultural development.

Within forty years after the peak of the lumber industry had been reached, Oneida County found that it was, through no choice, in the land business. In 1930 the county held a total or part interest in approximately thirty-six per-

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PROGRESS OF FOREST RESOURCE APPRAISAL

ON JULY 15, John B. Woods, director of The American Forestry Association's forest resource appraisal project, reported that field work was under way in nine states—Georgia in the southeastern region; Tennessee in the Gulf-eastern region; Arkansas in the Gulf-western region; Rhode Island, Connecticut and Vermont in the northeastern region; Ohio in the central region; Michigan in the Lake States region; and Colorado in the Rocky mountain region.

J. Lee Deen

In cooperation with the Georgia Agricultural and Industrial Development Board, Regional Consultant C. R. Ross and a staff of six full-time technicians are at work in Georgia, further aided by field men of the State Forestry Department. In Tennessee, State Forester H. O. Hazard and Regional Consultant M. A. Payne have started a joint project, giving special attention to the western counties. Elsewhere in the state, much valuable information has been gathered and made available by foresters of the Tennessee Valley Authority.

Rhode Island was selected by Regional Consultant P. L. Buttrick as the testing ground for airphoto mapping and fact-finding techniques. The work was completed in July, with the help of technicians placed at his disposal by State Forester E. C. Jacobsen. Meanwhile, Connecticut and Vermont state forestry agencies are undertaking similar studies in advance of the arrival of project personnel.

Regional Consultant Joseph A. Donery has made excellent progress in Michigan, with the assistance of state forestry authorities and forest school staff members. In Ohio a special study is under way to obtain correlation data for use in Illinois and Indiana. Field sampling is well advanced in the latter state, according to Roy C. Brundage, consultant for the region. Although field work is under way, no progress report was available for Arkansas and Colorado at the time of going to press.

The addition of three regional consultants and one assistant, also announced by Mr. Woods, completes the staff for the eight forest regions recognized by the project. Arthur M. Emmerling, a native of New York, and forestry graduate of Syracuse University, has been named consultant for the Gulf-western region, which includes Louisiana, Texas, Arkansas, Oklahoma, Missouri, Nebraska and Kansas. Identified since 1924 with industrial forestry, both public and private, in the Mississippi Valley, Mr. Emmerling has an intimate knowledge of forest conditions in that important timber producing territory, and is qualified for the exacting task of inventorying and appraising its resource of forests. Since 1941 he has been with the War Production Board as adviser to timber and forest products industries.

Burt P. Kirkland

Arthur M. Emmerling

J. C. H. Robertson

By special arrangement with the Colorado State College, J. Lee Deen, dean of forestry and range conservation, will serve as consultant for the Rocky Mountain region, comprising the states of Montana, Idaho, Colorado, Utah, New Mexico and Arizona. Regarded as an outstanding authority on forest and range conditions, Dean Deen is a graduate of the University of Minnesota and holds a Doctorate from Yale University.

Assisting Dean Deen in the region

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WHEN PILOTS WALK BACK

Survival May Often Depend Upon Woodsmanship—Practical Knowledge and Techniques Every Fledgling Airman Can and Should Acquire

By WILLIAM M. HARLOW

IN JUNE of 1942, a flight of training planes from across the border took to the air to work out a routine problem in night flying. The return leg of the triangular course lay northeastward along the St. Lawrence River Valley where the specified operating elevation of 2,100 feet was ample to clear by a safe margin any obstacles to flight. For two days the area had been covered with low clouds, and rain had fallen, but that evening the clouds lifted and visibility near the ground was improved.

The problem worked out as planned until the final leg was undertaken. Here, over the St. Lawrence Valley, the strong northwest wind marking the cold front of a passing storm set up a rapid southeastward drift, and the light training planes, were in a matter of minutes far off their course. Still at an elevation of 2,100 feet, but thirty miles southeast of the river, they were now running straight toward the fog-covered mountain peaks of the northern Adirondacks only seconds away.

Four of those planes never returned. Fortunately, most of their pilots did. Two planes crashed about a quarter of a mile apart on the same mountainside, and in each case the story of what happened was strikingly similar. The first warning was a slashing of young tree tops on metal, causing the pilot to haul back on the stick. A fraction of a second later, the entire wing ripped off and the fusilage plunged ahead on an even keel for a hundred yards before settling down on a relatively soft place on the mountainside. Of the two men in the plane, one was slightly injured and could not walk, the other was only shaken up. A few minutes before they had been air borne pilots, but now having hit a "shoal of the air," their ship would never fly again and their problem was one of survival and travel in one of the wildest, roughest and most inaccessible sections of the Adirondacks.

From this point it would be possible to go ten miles in twenty or more different directions without even finding a trail or other sign of human habitation. Ten miles in flight is as nothing, but on foot in this and many other parts of the world it is a hard day's task. Again, luck was with these pilots. Through the fog they could see several lights from a house on a lake far below at the base of the mountain. By morning, the uninjured man had stumbled through the rain-soaked brush to the lake, and a rescue party was on the way to his companion.

Since man learned to fly, hundreds of such experiences have taken place, are taking place as this is written, and will continue to happen as air borne commerce covers the skies, now and after the war. This business of "walking home," or of merely existing for that matter,

poses problems which are nothing short of colossal for a city-bred boy who is unaccustomed to them. It is as though he were suddenly deposited naked upon the doorstep of his great grandfather's pioneer cabin. Unfortunately, this forbear with a lifetime knowledge of primitive woodsmanship is no longer there; neither is the cabin with its shelter. Only a cellar hole now remains from which young trees grow, their leaves rustling dolefully in the cold night wind.

Naturally, an airman will stay with his ship if there is the slightest chance of being found. But in many cases, including the one already outlined, low-lying clouds may shroud the area for several days and during this time rescue planes may not be able to find the wrecked ship. Even when located, more days may elapse before rescue parties can toil through trailless forest or jungle to the marooned flyers. Finally, a plane may never be found under such conditions, or only months later when it is too late.

Common sense indicates that every airman should have basic knowledge and a certain amount of practice in methods of survival and foot travel through wilderness areas. Only those of us who have been training men for outdoor professions have any idea of how helpless the average youngster is when faced with primitive necessities. As an example, consider firebuilding. Anyone can drop a match in some leaves and start a blaze when everything is bone dry, and many do, as the number of forest fires will testify. But with a blanket of snow on the ground, and the temperature below zero, fire building is quite another matter. Under less exacting circumstances a group of men students in physical education required twenty minutes to shave up enough material to catch fire from a match! Even in summer after a soaking rain the uninitiated do not know where to find or how to produce tinder for successful fire making.

When the plane is left behind and the cross-country trek begins, hand skill with a screwdriver or wrench will not be of much value. The man who has owned, kept sharp and knows how to use a jackknife will be the one who has the best chance of coming out. In contrast to past generations of pioneer Americans, the present one knows little about the knife as a tool, and practically never has seen a really sharp one. They marvel when shown a good edge and what can be done with it. Recently, in an air crew class, one of the students was enquiring as to the location of a pencil sharpener. When asked if he had a knife he replied, "No, sir, I used to have one, but I was always cutting myself!" His instructor devoutly hopes this aviation student never has to walk home from a very great distance.

With a piece of fishline or wire, and some skill with a knife, snares can be made which will catch small animals while one sleeps. Airmen should know *where*, *when* and *how* to secure animal food, and there is plenty to learn about each of these three aspects. Many an airman has returned to civilization in a half-starved condition—and some have never returned—because they lacked just this knowledge. Small animals may be plentiful, but they are never seen unless one knows where and when to find them. Even after catching an animal there are pitfalls to avoid in its preparation for food. If certain inconspicuous glands are not removed, the meat may cause illness, and even in skinning the animal one may, if there is a small crack or abrasion on his unprotected hand, contract some animal disease which could prove fatal.

Those responsible for training our war flyers are fully aware of the importance of this kind of knowledge. The U. S. Army Air Forces and the Airlines War Training Institute have published booklets on "Jungle, Desert, Arctic Emergencies" and "Survival" under primitive conditions. Both of these are packed with useful facts for airmen. However, the mere possession of such facts is not enough. It is one thing to see a picture of an animal snare, but quite another to make one which will work. The latter calls for some nice whittling with a sharp knife, and only actual practice can teach this to a man.

The list of necessary Arctic equipment is headed by the ax. Having taught axmanship to camp leaders, it can be said that the use of this highly important tool is not instinctive to the average human. The untrained are lucky if they do not amputate a toe or split a shinbone, casualties which a grounded airman must avoid if he is to walk home.

Woodsmanship may be considered as one kind of air "first aid," and a certain amount of it should be taught to every airman in training. Does a week seem too long a time to devote to learning such skills? In five days of six hours each enough theory and practice could be covered to insure a man from making the most common mistakes which often prove fatal.

This can happen to any student airman. In such emergencies, practical woodsmanship is of greater value than skill with a screwdriver or wrench

Even though the country's forestry schools, with one or two exceptions, have been slow in appreciating the need for such training, they would seem to be the logical places for it to be given. They have the "know how," the equipment and teaching skills necessary for success. Parenthetically, many professional woodsmen are not especially good teachers because they assume too much knowledge on the part of the trainee. Some of the things an untrained person will do or try to do in the woods are incomprehensible to anyone who lives there.

Several months after the planes mentioned had crashed, three normal school students hiked six miles from their camp to visit them. On the way back, one became separated from the others. From

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A TREE AS A COURT WITNESS

By J. P. KINNEY

EVERY American forestry student has spent weary hours counting the concentric rings of growth on stumps or tree trunks to find out the ages of trees at various diameters or heights. Every such student was regularly cautioned as to possible false rings of growth. These stem analyses, as they are called, were based on the fact that the rings of growth in stems of trees gave a reasonably accurate index of age in years at the point where the cross-section count was taken. Testimony regarding rings of growth as showing successive years of age in trees has been accepted in American courts for more than fifty years.

In a Pennsylvania case in 1889 the counting of the rings at the upper end of the first log above the stump was accepted as determining the size of the tree at that height when a contract of sale was made seventeen years before cutting. In a later North Carolina case in 1910, whether there was one ring for each year's growth was held to be not a matter of law but one of fact to be submitted to the jury.

However, such was not the case a century ago. On December 3, 1830, the High Court of Chancery of Maryland rejected evidence of this character as inadmissible on the ground that the hypothesis regarding the relation between the alleged rings of growth and years of age was based upon speculation and conjecture.

The field notes of a 1791 land survey had referred to a black oak tree as a boundary reference mark and witnesses for M'Causland, who was claiming land under a survey of November 12, 1829, had submitted testimony identifying the black oak used as a boundary mark in the 1829 survey as the same oak mentioned in the survey of 1791. Patterson and Ellicott had then sought to discredit the testimony of M'Causland's witnesses by means of a section of wood cut from this oak tree showing, in 1829, only twelve rings of growth after the scoring of the tree. Patterson and Ellicott claimed that a tree scored in the year 1791 would show thirty-eight subsequent rings of growth and that if only twelve rings were found the tree could not be accepted as the one mentioned in the field notes of the 1791 survey.

At the beginning of his decision Chancellor Theodorick Bland said: "The evidence here relied upon to contradict and discredit the testimony of the witnesses who have been produced to prove the marking of this black oak as a boundary, is founded on a presumption, derived from what is alleged to be the regular course of nature in the growth of forest trees. I have met with no instance, in the books, in which proof of this kind had been received and respected in a court of justice."

The learned Chancellor then discussed the legal phases of the subject very briefly and the botanical implications very exhaustively in a decision that fills twenty-six pages of the printed report of decisions. The botanical discussions are supported by extensive footnotes giving the authority for the statements made and the conclusions reached with respect to tree growth. Both the main text of the decision and the extensive quotations from standard botanical publications of that day show extensive and comparatively accurate knowledge of the habits of growth and of the structural composition of trees. The uniformity of agreement in the publications cited and the weight of authority in the scientific quotations showed conclusively the relationship between the age of trees and the concentric rings in a cross-section of the stems.

The words used by the judge in describing the exhibit submitted by Patterson and Ellicott give the reader a mental picture almost as clear and definite as one that could have been presented by means of a photographic lens, if such a device had been in use at the time.

The words of the court are:

"The block here produced has been cut so deep from the trunk of this black oak, as to include, with the bark and all the newly formed layers of wood, eighteen others which had been formed when the chop mark was made. Judging from the appearance of the block and the segment of the circle formed by its outside, I should suppose that the tree was about one foot in diameter, and was at present in a youthful and vigorous state of vegetation. The block distinctly exhibits the new wood as being in every way perfectly united over the whole of the chop mark. Immediately over the chop mark there is much horny wood in which no concentrical layers are visible; but on one side of the chop mark, and where the concentrical layers appear to be a perfectly natural continuation of those into which the chop mark had been made, there can be counted no more than *twelve* additional concentrical layers. These new layers differ very much in thickness one from another, and altogether measure as much in diameter as the eighteen which had been previously formed. The whole or a part of the epidermis, or outside bark through which the chop mark was made, apparently still remains, with a perfectly formed new bark so closed over it as to leave nothing more than a scar or cicatrice where the chop mark had been made.

"The witnesses testify, that this chop mark was shown as having been made in the year 1791, now thirty-nine years ago, in accordance with which, if the hypothesis that each concentrical layer denotes the lapse of a year, be correct, there should have been found that number of concentrical layers; but there are no more than *twelve;* and, consequently, the testimony of the witnesses, or the evidence derived from this hypothesis, must be rejected. There is nothing whatever, in addition to this hypothesis, to impeach the credibility of the witnesses."

On the last page of his decision, at the close of long references to various authorities on tree growth, the Chancellor declared:

"I have nowhere met with the mention of any one single instance, in which the number of the concentrical layers, which could be distinctly counted, in the transverse section of the trunk of any forest tree, of a foot or more in diameter, had been found exactly to correspond with the years of its age, as otherwise well and positively known and ascertained."

This refusal of a court to accept the mute, yet relevant and competent, testimony of a tree as to the number of years that had elapsed since its bark and living tissue were scored obviously rested upon two premises:

First, that there was no legal precedent for the acceptance of such evidence; second, that there had been no instance in which the alleged rings of growth had been compared or correlated with actual records as to the number of years that had elapsed while a corresponding number of rings had been formed.

The court observed that the production of evidence, through the cutting out of a block of wood, might occasion the death of the tree and thus prevent the recurrence of the same kind of evidence. "To prove a living boundary by such means, it would be necessary to destroy it," said the court.

An interesting feature of this quaint old decision is its disclosure of the names that were given to the different early land claims in Maryland, such as, Litten's Fancy, M'Causland's First Attempt, Jolly's First Attempt, Litten's Fancy Enlarged, and Long Fought and Dear Bought.

FIRE IS STILL THE GREATEST THREAT TO AMERICAN FORESTS

The above picture shows a portion of the area burned over by the Tillamook, Oregon forest fire of 1933 which killed about 12 billion board feet of timber, an amount equal to all of the timber cut by all of the sawmills, all of the lath mills and all of the shingle mills in all of the 48 states in the year 1932.

The Tillamook fire killed the timber on some 270,000 acres of land within a period of 20 hours. Fire is the No. 1 enemy of forests and reforestation.

We and many other forest industry companies are harvesting our old growth timber in a planned effort to secure reforestation, to provide a continuous growth of timber crops and to make our industries permanent.

The success of these private enterprise ventures in industrial reforestation depends, in great measure, upon how well forest industries and the public do their part in the prevention of fire in the forests.

WEYERHAEUSER

Florida's Timber-Grazing-Game Program

By L. T. NIELAND

FLORIDA'S forests of old, the magnificent stands of pine and cypress and valuable hardwoods which formed the framework of the state's early development, are on the road back. After centuries of exploitation and destructive fires, the forces of conservation and forest restoration are at last forging steadily ahead.

It was, perhaps, inevitable that most of the virgin timber stand had to go. Much of it was mature, or over-mature, and particularly in the case of the predominant longleaf pines, the aging timber could not have been held long in reserve without deterioration.

Many factors inherent in the conquest of a new domain, of course, contributed towards excessive forest denudation. Fire constituted the greatest element of destruction, especially in the pine stands. Forest fires in Florida are not ordinarily of the spectacular type; usually most of the larger saplings and older trees are not killed when the ground cover is burned off. Destruction by such fires, however, is none the less severe through the years, because almost all of the young seedlings are killed while still hidden in the grass. This, more than overcutting, has resulted in the generally scattered and depleted stands.

In Florida, forest and grazing lands for the most part are still unenclosed. Cattle belonging to many different individuals roam the open ranges just as they have done for hundreds of years. And cattle owners, just as they have done for centuries, burn off the heavy, tough wire grass cover to provide early spring grazing when their herds are in need of tender new blades. This is part of the state's grazing economy and is, under present conditions, a necessary feature of Florida's great cattle industry. Cattle owners, large and small, still regard the vast, unfenced forest areas as a sort of public domain where they have always had the privilege of grazing their herds—and of burning the wire grass periodically. In recent years some cattle owners have acquired individual tracts and fenced their ranges, but this does not materially affect the procedure of burning to improve spring grazing. Woods burning, therefore, is carried out methodically, as a cultural practice in providing grass for cattle. And the cattle business antedates forestry in Florida by hundreds of years.

Small wonder, then, that clashes occurred when foresters came upon the scene and condemned woods burning as destructive, against the best interests of society. Cattle owners very probably asked "What society?" and the feud was on. Although progress has been made in forest protection and in better forest management during the fifteen years since forestry came into prominence, still much more forest land burns each year than landowners and the state can afford to lose. This is due in part to the newness of the forestry movement, but also—and probably in larger measure—to the absence in the past of a practical program which gave proper consideration to both timber growing and grazing interests.

Such a program has now been developed for Florida and shows promise of wide acceptance. It is a timber-grazing-game program which proposes the coordinated development of each of these resources in a practical, constructive way. In this new and positive approach all resources and all interests receive full consideration. Foresters, livestock men and wildlife specialists each have a part in the enterprise. As a result, forest and range landowners are showing keen interest in the plan.

In Florida, perhaps 30,000,000 acres, or approximately ninety percent of the total land area of the state, are adapted to, and may be made available for, such development. Incidentally, it probably offers one of the greatest opportunities for constructive and self-liquidating postwar employment. Not much more than twenty percent of this huge area is today under organized fire protection, and only a fractional part is being developed for grazing or wildlife.

Florida is in an unusually favorable position to combine grazing and game development—including fish—with good forest management. She has thousands of lakes and ponds suitable for food and game fish; natural food and cover for deer, wild turkey, waterfowl and many other kinds of small game are found throughout the state. Grass, suitable for the grazing of cattle, has long been the dependence of a large part of her population. And fast growing, early maturing timber species of unusually high value contribute materially to the attractiveness of such a three-fold undertaking.

In truth, Florida was set up as a timber-grazing-game enterprise under the old law of the wild, long before the white man came. Today, however, some modification of nature's way is necessary to make the project fit in with, and support, present and future populations. Since modern man draws heavily upon the land for food and shelter, better grazing than the native wire grass provides must be established, and a preponderance of native forest trees of highest value must be encouraged. Fortunately, each of these conditions can be met. In the matter of grazing, several introduced species of grasses have already increased beef production an acre ten-fold over the native wire grass.

This is of tremendous importance to cattlemen, but what has it to do with forestry? Today most of Florida's forest lands consist of scattered stands of longleaf and slash pine, the two most valuable species. Almost invariably the ground cover in these pine areas is composed of a heavy growth of matted wire grass which becomes highly inflammable during the winter months. Because of this inflammability, and also because it is burned to provide early spring grazing and to protect naval stores operations—indeed, it is an old custom among many people to burn off the wire grass "rough" each year—this dense growth is a perpetual fire hazard, a constant threat to successful forest protection. Fires become uncontrollable in a heavy wire grass "rough" during a March wind and range conditions are such that it is not possible to graze the wire grass closely enough to prevent a heavy accumulation.

Fire protection must be carried on for many years before the pine forests become so fully restocked that the highly combustible grass cover is crowded out. Until then, or at least for a number of years, protection increases the accumulation of inflammable wire grass. This is why forest landowners are interested in establishing introduced species of improved pasture grasses which have different growth habits, and are much more nutritious and palatable. Cattle graze these better grasses so closely that little inflammable material remains on the ground, and therefore such pasture sods do not constitute a fire hazard.

It is, of course, not practical to attempt to grow timber and grass on the same acre at the same time. All forest trees, to develop tall, clean, straight

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trunks, must be crowded severely while they are young. When grown in stands spaced closely enough to produce maximum quantity and high quality lumber, their dense shade will eliminate almost all grass. Therefore, the improved pasture areas must be established adjacent to the forested lands.

In Florida, nature has provided ideal conditions for just such procedure. Soils are extremely spotty and variable, and in almost all instances those suitable for improved pasture grasses intersperse the timbered lands. Frequently the soils which are better adapted to grass consist of moist swales or glades on which timber is sparse, or entirely absent. These low, grassy depressions, usually several hundred feet wide, often meander for miles through the woodlands. With a minimum of effort and cost, the heavy wire grass cover in these low, flat areas can be killed by shallow disking, and the land converted in one seeding to the much more valuable and fire-resistant pasture grasses.

Taking advantage of these broad bands of natural grass land by converting them into improved pasture strips, and then connecting them with other improved pasture fire-barrier lanes at strategic intervals, a system of wide, closely grazed fire lines can be established which will make successful fire protection possible. Such grazing strips have the additional advantages of being permanent, require no cultivation, and will usually provide a larger income through beef production than would be possible on an area of equal size in timber.

It is estimated that as much as ten to twenty percent of the area in a forest holding depending, of course, on existing fire hazards, may need to be converted to these improved pasture fire barriers in order to insure proper fire protection. To many forest landowners, this acreage might be necessary to provide income through grazing while their depleted forest lands are becoming restocked. So superior are the new grasses that when a given forest area has been provided with enough improved pasture fire lines to insure fire protection, more and better cattle can be carried than formerly under the old system of wire grass and periodic burning of the entire area.

Where grazing is the principal interest, as with cattle ranches, most of the land suitable for improved pastures will be converted into grazing areas. This, however, does not mean that cattle owners will ignore timber, or that forest trees may not be an important source of supplemental income. In almost all cases a grazing range will have soil areas which are either too poor, or too dry or wet, for grass. Certain forest trees are well adapted to such areas and, under fire protection, will contribute considerable revenue. Also, there are found, here and there, small, dense stands of pine saplings which have somehow escaped fire. It might often be profitable to save these for forest growth, rather than remove them for additional grazing. Such "islands" of timber scattered throughout the range will furnish shelter from the weather for cattle, food and cover for wildlife, and bring in additional cash from the sale of forest products. The protection of such timbered spots is a simple matter, as they will usually be surrounded by improved pasture areas.

While the production of game and fish must be incidental to the main enterprises of forestry and grazing, nevertheless this will always be an important feature. Florida is the winter playground for a great number of people. Good hunting and fishing grounds will always be in demand. The sale of hunting and fishing privileges where deer, wild turkey and small game, or black bass and perch are plentiful, can be depended upon for many extra dollars each year. The restoration of game and other wildlife will often entail little, if any, additional expense. Simple conservation measures and the provision of food and cover are usually all that are necessary to bring back this important resource. Good management of forest and grazing ranges will in itself provide the foundation for many kinds of wildlife.

Thus Florida's timber-grazing-game program promises to be a happy solution to an old problem. The ancient conflict between grazing interests and timber growers should gradually disappear, because each can find opportunity for a more successful operation under the program than was possible heretofore. And because it is a constructive undertaking, conserving and developing all natural resources, the best interests of landowners, labor, industry and the state will be served.

CONSERVATION IN THE REPUBLICAN PLATFORM

"We shall at all times protect the essential interests and resources of the United States.

* *

"Abundant production is the best security against inflation. Governmental policies in war and in peace must be practical and efficient with freedom from regimentation by an impractical Washington bureaucracy in order to assure independence of operation and bountiful production, fair and equitable market prices for farm products, and a sound program for conservation and use of our soil and natural resources. . . . For the establishment of such a program we propose . . . . a comprehensive program of soil, forest, water and wildlife conservation and development, and sound irrigation projects, administered as far as possible at state and regional levels.

* *

"The Federal Government should plan a program for flood control, inland waterways and other economically justifiable public works, and prepare the necessary plans in advance so that construction may proceed rapidly in emergency and in times of reduced employment. We urge that states and local governments pursue the same policy with reference to highways and other public works within their jurisdiction.

* *

"We favor a comprehensive program of reclamation projects for our arid and semi-arid states, with recognition and full protection of the rights and interests of those states in the use and control of water for present and future irrigation and other beneficial consumptive uses. We favor . . . . withdrawal or acquisition of lands for establishment of national parks, monuments and wildlife refuges, only after due regard to local problems and under closer controls to be established by the Congress; restoration of the long established public land policy which provides opportunity of ownership by citizens to promote the highest land use; full development of our forests on the basis of cropping and sustained yield; cooperation with private owners for conservation and fire protection. . . ."

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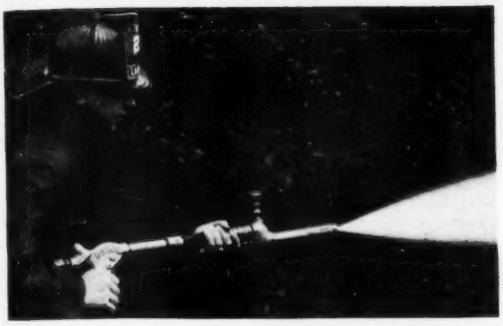

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THE FMC FOG FIRE FIGHTER GUN can be adjusted for all types of fires. Fireman above is holding trigger release with his right hand and adjusting barrel with his left hand. By turning the barrel slightly, he can change the flow from a straight stream to a wide fog pattern.

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The high-pressure blasts the water into the burning trunks, into the packed leaves, moss and rotten wood; tears them apart and smothers the flame.

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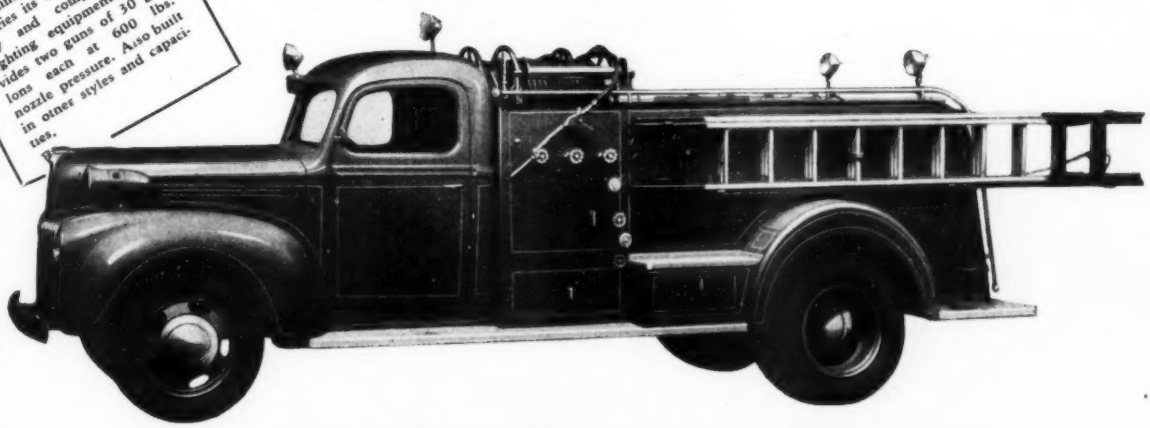

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CONSERVATION IN CONGRESS

PASSAGE by Congress early in June of appropriation bills for the Departments of Agriculture and Interior made available over $77,000,000 for the conservation activities of these two departments during the fiscal year which began July 1, 1944. The bulk of these funds are for the Forest Service and the Soil Conservation Service of the Department of Agriculture. Both agencies receive approximately $30,000,000 each.

A breakdown of the funds according to specific lines of work is given in the accompanying columns. While a comparison of allotments available this fiscal year and those received last fiscal year would indicate an increase for the current year in some items, this does not necessarily follow in that current appropriations include funds to cover overtime pay. Last year these funds were provided in separate deficiency bills. In a number of cases, however, small increases were granted by Congress. The Forest Service, for example, received additional funds for the handling of timber sales in the national forests, for the work at the Forest Products Laboratory, Madison, Wisconsin, and for chemical research in connection with the naval stores industry. Total funds for activities of the Service are without benefit of a 1945 appropriation for its emergency rubber project in the growing and conservation of guayule and other rubber bearing plants. Instead of appropriating funds for the continuation of this project, Congress authorized the Service to expend during the current fiscal year unobligated balances from the previous three years amounting to $5,338,900.

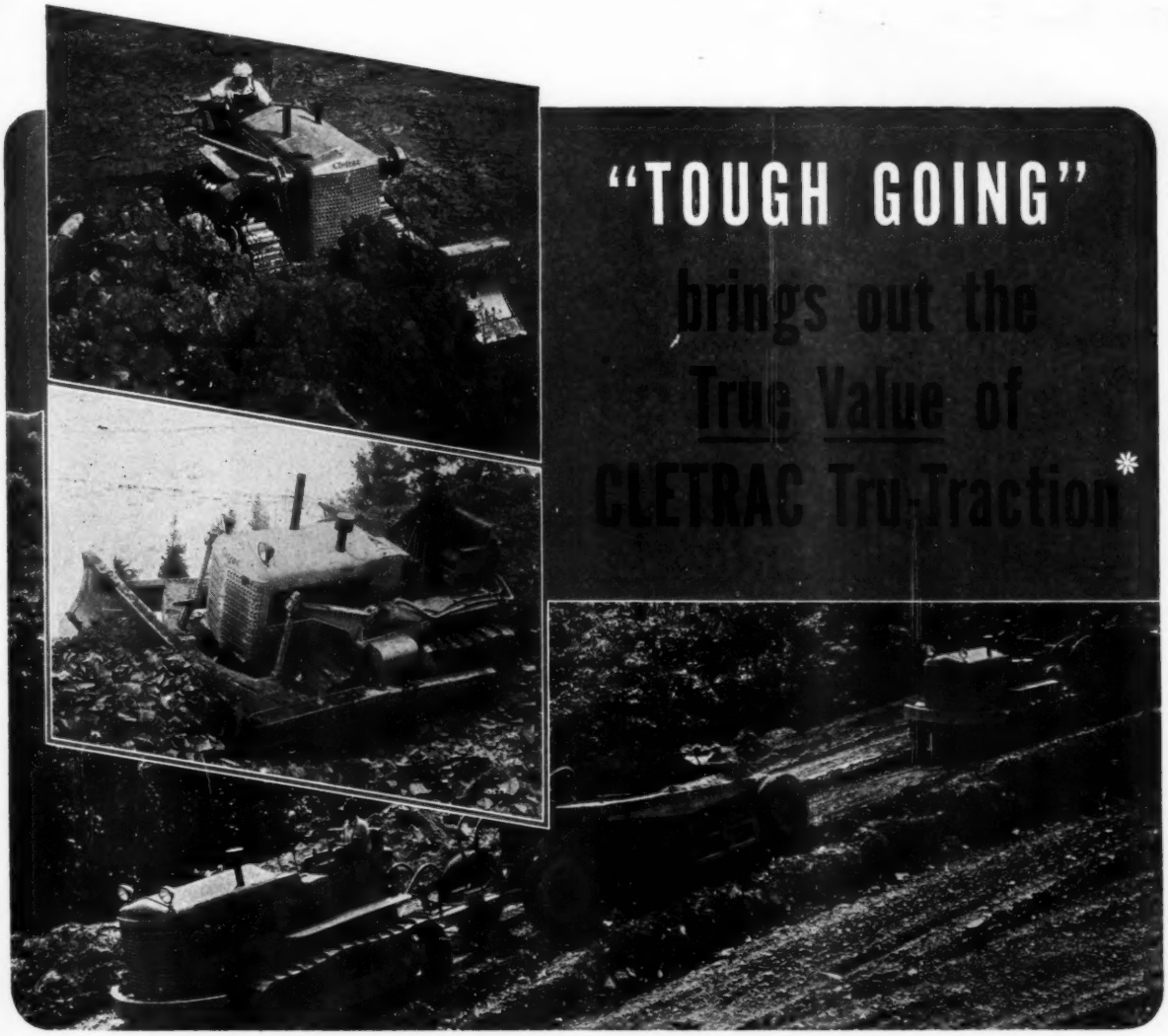
An item of special interest in the appropriations for the Department of Agriculture is $6,300,000 for cooperative forest fire control by the states, private timberland owners and the federal government. Of this amount, the Act provides that $1,000,000 may be spent without matching by the states for use on areas considered exceedingly critical from the standpoint of war activities. The remaining $5,300,000 must be matched dollar for dollar by the states.

Bills still pending in Congress in which there is special interest include Congressman Barrett's bill, H. R. 2241, to abolish the Jackson Hole National Monument, and two bills, S. 275 and H. R. 1688, relating to O and C administration of some 465,000 acres of land now in national forests in Oregon. No action was taken on these bills up to the time Congress recessed.

FEDERAL CONSERVATION FUNDS

Appropriation and Project	1945 Appropriated	1944 Appropriated
Department of Agriculture		
Forest Service (Total)	$30,802,522	$43,044,334
General Administration	625,000	563,670
National Forests (Total)	19,494,688	19,171,216
General Management	5,994,077	5,994,077
Maintenance of Structures	930,659	930,659
Fire Control	6,771,386	6,771,386
Forest Pest Control	109,674	109,674
Timber Sales	2,361,900[1]	2,013,428
Grazing Administration	497,795	497,795
Wildlife Protection	91,086	91,086
Policing	161,496	161,496
Land-use Management	520,226	520,226
Water-use Management	25,706	25,706
Improvement Constructions	79,096	79,096
Planting and Plantation Care	186,325	186,325
Services for Other Agencies	600,000	600,000
Fighting Forest Fires	100,000	100,000
Land Acquisition	75,000	100,000
Roads and Trails	990,262	990,262
Cooperative Work (Total)	7,081,466	7,046,168
Fire Suppression (Clarke-McNary)	6,300,000	6,300,000
Forestry Cooperation	781,466	746,168
Research (Total)	2,269,368	1,880,280
Forest Management	506,348	400,000
Range Investigations	288,475	250,000
Forest Products	1,147,519	940,280
Forest Survey	156,246	140,000
Forest Economics	84,018	75,000
Forest Influences	86,762	75,000
Emergency Rubber Project	.....[2]	13,048,000
Naval Stores Investigations	112,100	115,100
White Pine Blister Rust Control	1,219,900	1,219,900
Forestry in Other Agricultural Bureaus (Total)	31,529,401	22,494,799
Bureau of Entomology and Plant Quarantine		
Gypsy and Brown-tail Moth Control	409,320	350,000
Dutch Elm Disease Eradication	300,000	333,330
Forest Insects	202,000	150,000
Blister Rust Control	840,953	839,953
Soil Conservation Service (Total)	29,637,248	20,675,136
Extension Service		
Private Forestry Cooperation	108,380	108,380
National Arboretum	31,500	38,000
Total Agricultural Department	62,331,923	65,539,133
Department of Interior		
Grazing Service (Total)	1,751,240	1,715,265
General Administration	1,017,740	866,700
Range Improvements	115,000	75,000
Leasing Lands	8,500	9,000
Soil and Moisture Conservation	495,000	555,052
Fire Protection (Forests)—Natl. Defense	115,000	209,513
General Land Office (Total)	633,900	730,686
Forest Fire Protection—Alaska	33,900	29,500
Forest Fire Protection—National Defense—Alaska	125,000	149,100
O and C Lands—Administration and Protection, Including Emergency Fire	335,000	405,546
Soil and Moisture Operations Public Lands	95,000	110,040
Range Improvements Outside Grazing	45,000	36,500
Bureau of Indian Affairs (Total)	1,222,000	1,210,965
Administration of Forests	504,000	412,500
Timber Sale Expenses	175,000	140,000
Forest Fire Suppression		
Regular	12,000	12,000
National Defense	110,000	173,400
Soil and Moisture Conservation	421,000	473,065
White Pine Blister Rust Control (Total)	203,173	170,749
National Park Service (Total)	4,756,810	4,053,310
Fish and Wildlife Service (Total)	6,085,548	5,456,390
Office of Fishery Coordination (Total)	290,000	175,000
Total Interior Department	$14,942,671	$13,512,365

[1]Supplemental appropriation of $596,000 not included.
[2]Unobligated balances, not to exceed $3,020,985, of previous appropriations for 1942 and 1943, merged with 1944 appropriations, making a total of $5,338,900.



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Death Claims State Forester Fred C. Pederson

By CHAPIN JONES

FRED C. PEDERSON, state forester of Virginia since 1933, died on June 27 at his home in Charlottesville as the result of acute leukemia. In his death, the Commonwealth of Virginia and the profession of forestry have suffered a grievous loss.

Born in Frewsburg, New York, in 1891, and educated at the New York State College of Forestry at Syracuse, where he received his B.S. degree in 1916, Mr. Pederson began his forestry career with the U. S. Forest Service in South Dakota. From 1917 to 1919, during the period of World War I, he served in France with the 10th Forest Engineers. Resuming his forestry work, which included experience with lumber companies in New York State, he became associated with the Virginia Forest Service as district forester in 1921. In 1925 he was appointed assistant state forester and succeeded the writer as state forester in 1933.

F. C. Pederson

Fred Pederson's outstanding characteristics were his forceful personality, earnestness and speed with which he worked. He was always making friends —for forestry—and influencing people to take care of the forests. There was also a steadfastness and hard common sense about him that made him retain, when he became state forester, essentially the same personnel and organization which he found when he assumed that office, and drive toward the principal ideal that had animated the service staff from its beginning. This was to concentrate on "first things first"—that is, fire protection first, and to get as much forest fire protection possible for every dollar spent of the taxpayer's money. The Virginia Forest Service has always had an enviable record for getting a lot of fire protection for every dollar spent. Mr. Pederson, both as assistant and state forester, played a major part along with his associates in establishing and maintaining this record. His devotion to the task, his administrative ability and his leadership were of the highest order.

One illustration may be given. During the five-year period, 1938 to 1942, a comparison of the percentage of protected area (state owned and privately owned) that was burned in the different states showed that Virginia stood twenty-third from the top; yet during the same period Virginia stood thirty-sixth among the states in total expenditures per acre protected. In fact, the total expenditures per acre, including administrative overhead, were on the average only one and three-tenths cents a year. Yet reasonably good results were obtained, a real tribute to the foresters and wardens under Mr. Pederson's leadership.

The improvement of Virginia's forest fire laws was always a challenge to Mr. Pederson. Beginning when he was a district forester, he consistently urged more assured and larger funds for paying firefighters, which was achieved in 1926 when counties were required to pay for the services of men employed as forest wardens to fight fires. Further outstanding progress was made with the passage this year of legislation providing for the establishment of a fund of one percent per wooded acre in each county, out of which the state forester can pay not only for fire suppression but for all other fire protection costs incurred in that county, including tools and equipment. Mr. Pederson and his associates also secured passage in 1940 of a so-called "four o'clock brush-burning law" which is proving very effective.

In recent years Mr. Pederson devoted much energy to promoting the management of privately owned forests in Virginia as permanent, profitable sources of forest products. He devised effective charts in illustrating the benefits that result with better management of forests.

In 1938, he served as president of the Association of State Foresters. As a senior member of the Society of American Forests, he was active on committees promoting forestry legislation and appropriations, both state and federal, and had the confidence of those members in Congress with whom he came in contact.

Commenting on his death, William E. Wright, chairman of the Virginia Conservation Commission, said: "Fred Pederson was one of the most valuable men in the service of the state. He has left an enduring example of devotion and fidelity to duty that all of us might do well to emulate."

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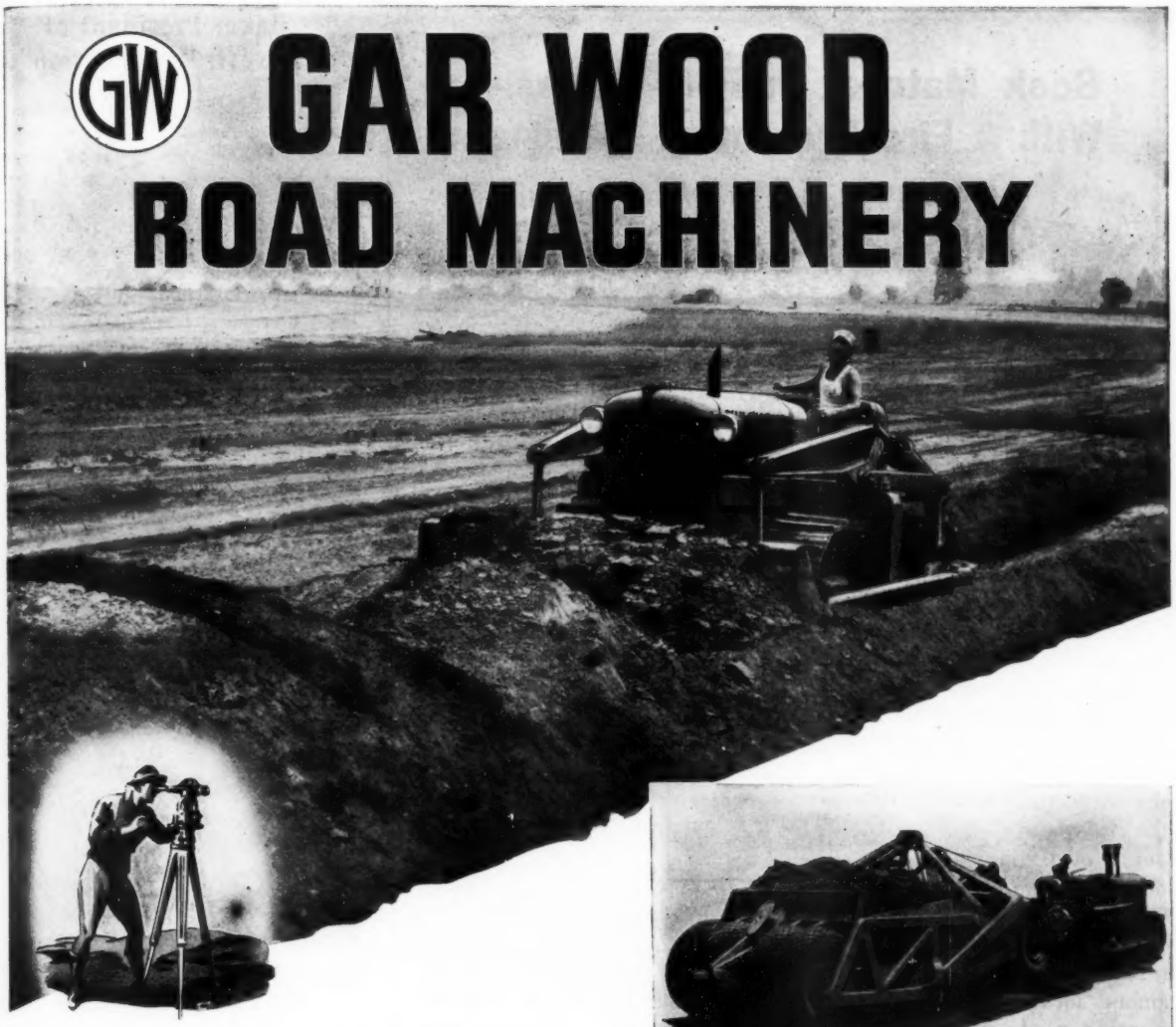

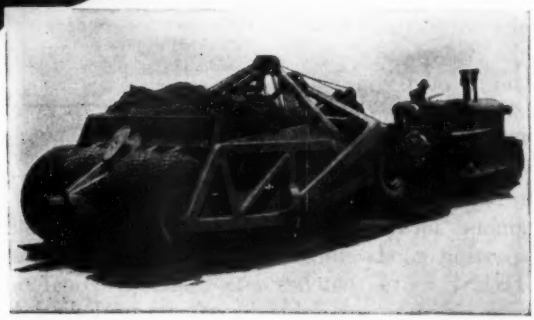

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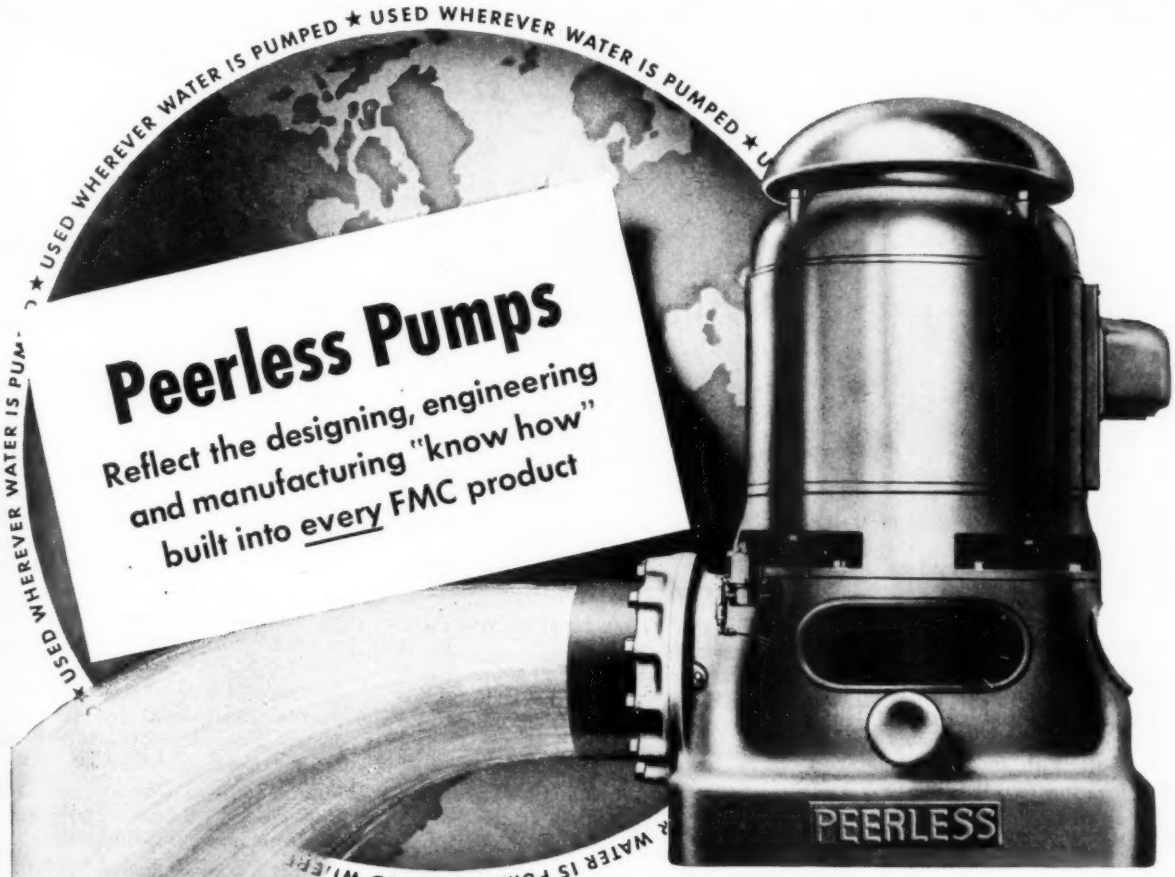
Baker President of Forestry Foundation

DR. HUGH P. BAKER, president of Massachusetts State College, was elected president of the New England Forestry Foundation at its organization meeting held in Boston late in June. Harris A. Reynolds, secretary of the Massachusetts Forest and Park Association, sponsor of the Foundation, was named secretary, and Charles F. Adams of the State Street Trust Company, Boston, treasurer.

Nine directors were elected. They are: Farnham W. Smith of the Blanchard Lumber Company, Boston; Lawrence W. Rathbun, secretary of the Society for the Protection of New Hampshire Forests; Nathan Tufts, vice-president of the New England Box Company, Greenfield, Massachusetts; Professor R. C. Hawley, Yale School of Forestry; Lt. Curtis M. Hutchins, Dead River Company, Bangor, Maine; William P. Wharton of Groton, Massachusetts, president of the Massachusetts Forest and Park Association; H. G. Schanche, woods manager, Brown Company, Berlin, New Hampshire; George W. Wheelwright, Mead Corporation, Leominster, Massachusetts, and Sheldon E. Wardwell, director, Great Northern Paper Company, Maine.

Dr. Hugh P. Baker

The New England Forestry Foundation has been organized as a non-profit corporation for the purpose of increasing wood production and the encouragement of better forestry in New England. It will acquire forest lands and place them under expert management; it will assume the management of woodland tracts for other owners; and, it will provide on a local basis the services of foresters at cost.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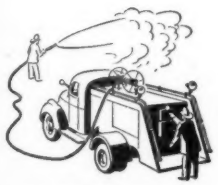

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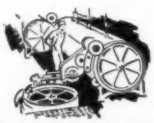

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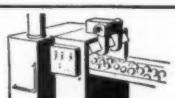

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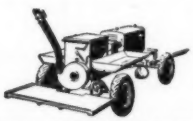

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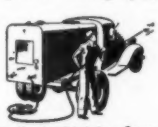

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THE WOLVES OF NORTH AMERICA, by Stanley P. Young and Edward A. Goldman. Published by the American Wildlife Institute, Washington, D. C. 636 pages, illustrated. Price $6.00.

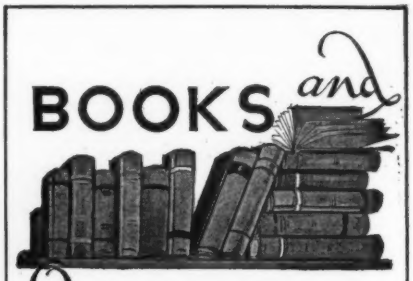
Few if any wildlife animals have had a more interesting or checkered career than that of the wolf. Its existence goes back to Biblical days and beyond in that its footprints have been found in molten stone of the Pleistocene Age. Throughout civilization, it has figured in the life, literature and political economy of the human race which appears always to have been against it. But man, despite all his ingenuity has never been able completely to conquer it for the wolf still populates vast areas of both Asia and North America.

This volume is a comprehensive history of North American wolves, their life habits, economic status, control and classification. It is the work of two noted authorities in the field of wildlife —Mr. Stanley P. Young, a recognized authority on predator animals, particularly the wolf, and Major Edward A. Goldman, a leading authority on native North American mammals. Both men have long been members of the U. S. Biological Survey which recently became a part of the Fish and Wildlife Service of the Department of the Interior.

"The Wolves of North America," it seems safe to predict, will receive instant recognition as the standard work on the American wolf. It represents years of field study and research on the part of the authors and brings together all information and literature of historical import concerning American wolves, including knowledge of the authors derived from first hand experience with the animal. In its almost 650 pages, it includes 131 illustrations, among which are a number of excellent plates depicting the wolf in its natural colors and environment. Also included is a bibliography of selected wolf literature probably more complete than has ever been compiled. It may well rank as the book of the year in the wildlife field.

PLASTICS FROM FARM TO FOREST, by E. F. Lougee. Published by the Plastics Industries Technical Institute, Chicago. 159 pages, illustrated. Price, $2.00.

The author of this enlightening little book is the editor of *Modern Plastics*, who sees increasing opportunity for agriculturists, dairies and wood products manufacturers to investigate their waste by-products and convert them through cooperative effort to raw materials for plastic manufacture. He points out in this book how farm chemurgy has taken partial advantage of these opportunities during the past decade, and makes some very pertinent suggestions for the future.



OTHER PUBLICATIONS

A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

WOODLAND OPPORTUNITIES ON DAIRY FARMS IN NEW YORK, by Hugh A. Johnson, Irving F. Fellows, and Donald Rush, Bureau of Agricultural Economics, and C. R. Lockard and C. Edward Behre, Forest Service, U.S.D.A. Published by Charles Lathrop Pack Forestry Foundation, Washington, D. C. 35 pages, ills.

This bulletin, the joint effort of economists and foresters, is particularly noteworthy. Agricultural economists have been prone to ignore the significance and importance of woodlands in the farm economy, while foresters have been carried away by enthusiasm for some silvicultural ideal that lacks practical appeal to the farmer. Only as sound economics and sound silviculture are joined is there hope for successful farm forestry here in the Northeast. Though the authors do not specifically say so, it is clear that the text was primarily written for dairy farmers. It is, nevertheless, bound to give such farmers greater respect for that part of the farm that is in woods.

As a stimulus to a better appreciation of farm woodlands on the part of the owner, this reviewer believes the text might well have ended with the findings and analysis of the survey. Instead, the last two-thirds of the bulletin is taken up with plans and procedures for improving the woodland area on sample farms. The change from facts to theory tends to detract from an otherwise excellent and valuable contribution to the literature of farm forestry. This most recent of the Pack publications is illustrated by animated graphs,—a particularly effective way of portraying the various items of income and outgo entering into the complex business of farming.

The publications listed below must be ordered direct from the addresses as given and not through the Association.

Thinning a Pine Plantation, by F. G. Wilson. Pub. 515, A-44, State of Wisconsin Conservation Dept., Madison, Wis.

Proceedings of the Eighth American Scientific Congress—Vol. V, Agriculture and Conservation. Department of State, Washington, D. C.

Ten Year Progress Report, 1928-1938, by Henry H. Tryon. The Black Rock Forest, Cornwall-on-the-Hudson, N. Y. Bull. No. 10. 76 pages, illustrated. Price $1.50.

Practical Forestry in the Hudson Highlands, by Henry H. Tryon . . . "the result of seventeen years of intensive experimental treatments and close observation of results in the Black Rock Forest . . . located in the Hudson River Highlands." (See critical review, Journal of Forestry, Vol. 42, No. 4, page 296.) Bull. No. 12, 50 pages. The Black Rock Forest, Cornwall-on-the-Hudson, N. Y. Price $1.00.

Colorado Evergreens, by Robert E. More. University of Denver Press, Denver, Colo.

Oberlin Trees—of Campus and Town, by Chester F. Ralston. Published by Oberlin College, Oberlin, Ohio.

Food In War and Peace, by Karl B. Mickey. Public Relations Dept., International Harvester Co., 180 North Michigan Avenue, Chicago, Ill.

Community Recreation Buildings As War Memorials. National Recreation Assn., Inc., 315 Fourth Avenue, New York, New York. Price $1.00.

Forests and Forest Industries of the Grays Harbor Unit. Forest Ecs. Rep. No. 1, and *Forest Statistics for Lincoln Co., Oregon*. For. Service, U.S. D.A., Pac. Northwest For. and Range Exp. Sta., Portland, Ore.

Common Forest Trees of North Carolina —How to Know Them. By J. S. Holmes, State Forester. A pocket manual published by The North Carolina Department of Conservation and Development, Raleigh, N. C. Fifth edition. Price ten cents.

Handbook of Standard Forestry Practices for South Carolina. Published by the South Carolina State Commission of Forestry in cooperation with Clemson Agricultural College, Clemson, S. C.

The Protection of Migratory Birds—the migratory birds convention Act and Federal Regulations. Department of Mines and Resources,—Lands, Parks and Forests Branch, National Parks Bureau, Ottawa, Canada.

FOREST APPRAISAL

(*From page* 393)

is J. C. H. Robertson, associate professor of forest management at Colorado State College. A native of Scotland, he holds a B.S. degree from the University of Washington and an M.F. degree from the University of California.

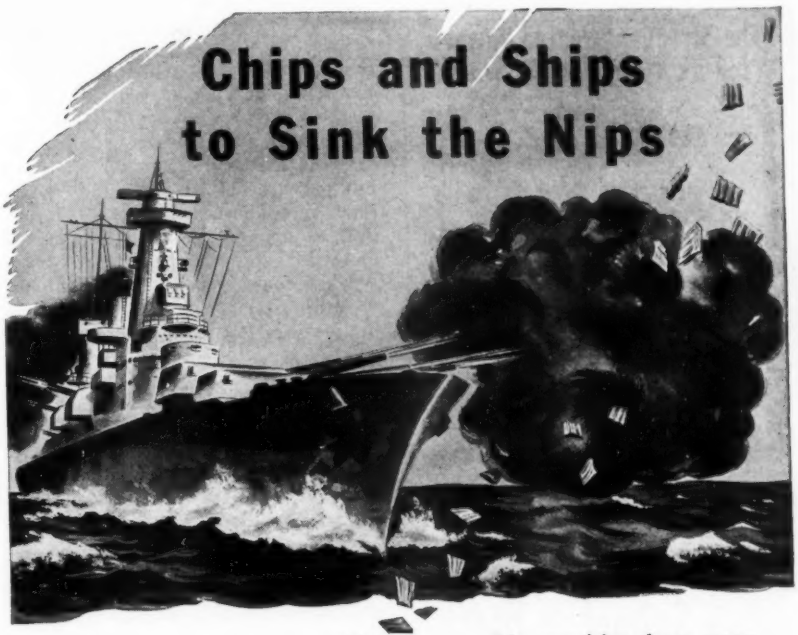
For the Pacific Coast region, the services of an outstanding forest economist, Burt P. Kirkland, have been enlisted. Principal forest economist for the U. S. Forest Service since 1931, he formerly was professor of forestry at the University of Washington. He is a graduate of Cornell University and the Yale School of Forestry. Mr. Kirkland's long experience on the Pacific Coast and his recent studies in the field for the Forest Service qualify him to render outstanding service to the Association's forest resource appraisal.

As of July 15, contributors to the appraisal project numbered 446. Of these, 326 were individual contributors, ninety-six industrial companies and twenty-four conservation and trade associations. Of the $250,000 needed to complete the appraisal on the basis originally planned, approximately $216,000 has been underwritten.

Lists of contributors have been published in the January, February, March and May issues. Since then, subscriptions have been received from the following:

Henry R. Benjamin, New York; Berst-Forster-Dixfield Company, New York; C. Blankinship Lumber Company, Bay Springs, Miss.; Brooks-Scanlon Corporation, Foley, Florida; Distilled Spirits Institute, Washington, D. C.; Theodore M. Edison, West Orange, N. J.; Forest Farmers Association Cooperative, Valdosta, Ga.; the Garden Club of America, New York; and Earl Godwin, Washington, D. C.

Hummel-Ross Fibre Corporation, Hopewell, Va.; Miss Leslie Hunt, Arlington, Va.; Miss Nolye Hunt, Arlington, Va.; Mrs. Dora R. Isenberg, Lihue, Kauai, Hawaii; Mrs. E. W. Karcher, Kearsarge, N. H.; Keyes Fibre Company, Waterville, Me.; Norman B. Livermore, Jr., San Francisco; Former Governor C. H. Martin, Portland, Ore.; Dr. George W. Norris, Dimock, Penn.; Oregon Forest Fire Association, Portland; Mrs. Gertrude W. Page, Aberdeen, N. C.; The Rosecrans Foundation, Los Angeles, Calif.; Mrs. Dorothea Sheats, Arlington, Va.; H. A. Smith, Guntersville, Ala.; Society for the Protection of New Hampshire Forests, Concord; Society of American Foresters, Washington, D. C.; and the Wyoming Tie and Timber Company, Chicago.



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Reduction in Hunting Licenses Reported

SPORTSMEN spent $13,598,423 for 8,091,187 hunting licenses during the 1942-43 season, the U. S. Fish and Wildlife Service reported early in July upon the completion of a summary based on figures supplied by the states. These totals represent a decrease of 441,167 in licenses and $323,551 in fees as compared with the preceding year.

In revenue received, Pennsylvania led all other states with $1,406,310. Next in line was Michigan with $1,161,808; New York with $775,299; Ohio with $698,376; California with $638,577; and Minnesota with $514,830.

In number of licenses issued, Michigan topped the list with 795,251, followed by Pennsylvania with 648,620; Ohio with 553,072; New York with 552,004; Indiana with 376,949; and Minnesota with 371,082.

Since the total of 8,091,187 licenses includes 565,392 for big game, in addition to small game licenses, there is a duplication to an unknown extent in the number of hunters in some states. Many big game hunters undoubtedly also purchased small game licenses, and when that occurred, two license sales were recorded for each hunter. Total license sales also include 1,471,254 combination hunting and fishing licenses which were sold by states having a system that makes it necessary for sportsmen to purchase combination licenses.

Federal migratory-bird hunting stamps, commonly called "duck stamps," were issued to 1,380,092 sportsmen for use during the 1942-43 season. This figure is only 57,128 less than the number sold during the preceding year. The federal stamps, at $1 each, are required of all waterfowl hunters over sixteen years of age, in addition to state licenses. The total paid for state licenses and federal duck stamps amounted to $14,978,515.

Licenses authorizing the trapping of fur-bearers were granted to 2,440,214 persons, at a cost of $328,907. However, many of them were combination licenses which the holders obtained in order to hunt or fish, it was pointed out.

Forestry for Private Enterprise

(*From page* 392)

cent of all area within the county—mainly through default of tax payments. Generally speaking, these were cutover, burned-over barrens of low value. With the withdrawal of these delinquent denuded acres from the tax rolls, the tax rate on the remaining private properties increased, and in turn caused further delinquency of marginal character properties.

With the county owning around 260,000 acres, it was contended that efforts should be made to sell the land, even in a piecemeal manner, so as to get it back on the tax rolls. The depression years of the early thirties witnessed a back-to-the-country movement and numerous county-owned holdings were sold to this new class of settler. The number of farms in Oneida, under this impetus, increased almost thirty percent between 1930 and 1935.

However, the unrestricted settlement on these recently purchased lands created new perplexities for town and county officials. These depression pioneers, who acquired property in outlying districts, demanded that roads be built and school facilities offered their children. The costs of providing these services in isolated areas often were greatly in excess of the meager taxes received in return. It became evident, therefore, that in order to curtail local governmental expenditures, some restrictions were needed to prohibit persons from moving into these out-of-the-way places.

In 1933, Oneida passed a land zoning ordinance in an effort to alleviate indiscriminate settlement. The gist of this ordinance provided that there should be a preconceived plan for the development

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and use of the major land classes throughout the county. The towns, through local planning committees, delineated on maps those areas which they believed were primarily adapted to forest and recreation use. These were prohibited to new settlement. Other areas which were desirable for farming, or were conveniently located in respect to existing roads, were unrestricted as to character of use and further development.

Through the passage of this ordinance, comparatively large blocks of potential forest areas were created, mostly in county ownership. To facilitate the administration and development of these holdings, the county designated several of the larger tracts as county forest units. These were enlarged as additional lands became delinquent. By 1941, Oneida's forest holdings totaled 220,000 acres, mainly in three large blocks.

Under certain provisions of the Wisconsin forest crop law, county lands devoted to forest development entitled the local governmental units to certain incentive payments. As an aid to local towns, the state reimbursed them, in lieu of taxes, at the annual rate of ten cents an acre. The county received a similar allowance from the state, but this allotment was earmarked for forest planting and other betterment work. To compensate the state for these payments, the county returned approximately fifty percent of all stumpage receipts from timber sold from county forest crop lands.

While such disposition and use of tax delinquent lands in a sense benefited the local towns, there nevertheless was a pronounced drift of the county into the land and forestry business. Repeatedly the question arose: Was it the function of a county government to be in the forestry business? Oneida County answered this in 1942 when it sold a 30,000-acre block of delinquent cutover land. A year later a 12,000-acre block was sold to the previous successful bidder. This year a 45,000-acre tract was put up for sale—and sold. These dispositions were made possible largely through the result of a well integrated county land policy and by cooperative county officials who sensed the advantages of working with, rather than against, private enterprise.

Although the industrial forestry movement in Oneida County is still in its infancy, it is not premature to anticipate what benefits might result from such a program. The local tax situation will undoubtedly be the first tangible evidence. The re-entry on the tax rolls of lands sold in 1942 was instrumental in bringing about a reduced tax rate in several of the towns. With a reduced tax rate, the amount of further delinquency in and adjacent to these industrial forest

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units will, in all probability, be decidedly curtailed.

In addition to the stabilizing influence of these large holdings on the tax problem, there are, of course, other likely benefits to be derived. To manage these lands under an intensive program, there will be need for an unestimated amount of improvement work. Roads must be built. A large acreage must be planted so as to increase both the quality and quantity of preferred growing stock. Stand betterment through cultural operations is needed, and in time will undoubtedly be undertaken so as to realize the greatest yields in the shortest rotations. Small scale, family-sized, utilization jobs are needed to remove what mature timber there is, thus making room for a new crop of pulp.

Irrespective of the work program to be followed, there will be a distinct need for local labor to assist in this rebuilding of the new forest. It has been estimated that of the 815 farms in Oneida County, only twenty-six percent are regarded as full time enterprises. The opportunity of using this local, off-season, farm labor will receive the utmost consideration. The orderly and planned development of these industrial forest units will play an important role in the economic and social pattern of the county's rural communities.

The purchase of these cutover lands in Oneida represents the culmination of a practical land management policy by the county and a challenge to industry to carry on and rebuild the forest under a system of free enterprise. The ultimate success of this venture in private forestry in one of Wisconsin's twenty-four cutover counties, depends to a great extent upon the public's acceptance and willingness to further the cause. Industry neither asks nor expects special favors in accomplishing the task before it. Likewise it believes that the road ahead should be kept as clear as possible of any obstacle or encumbrances which might alter its course and retard the fulfillment of its objective of growing trees for tomorrow.

"Les Landes"

(*From page* 382)

further work.

That is, except by Chambrelent, whose engineering studies showed that this vast plain was covered by sand, without trace of clay or lime, spread out by the Gironde River in geologic times. This sandy layer was eighteen to twenty-four inches thick and lay on an impervious layer called "alios", which proved to be nothing more than sand cemented together by vegetable material. This subsoil is impermeable; it contains no springs or water in summer, but retains the stagnant flood waters for six months in winter.

Chambrelent found these plains to have a regular slope to the sea, and that a ditch of three or four feet in depth would drain away the stagnant waters. With a slope of one to three in a thousand, the waters would flow slowly and regularly without eroding their channels. Below this cemented, impermeable layer, experimental wells proved that the sands were permeable. If ditches were placed, even at considerable distances apart, complete drainage of the soils could be accomplished.

Chambrelent was unable to convince the authorities or the communes that this was true. Accordingly, in 1849, he purchased 1200 acres in the most sterile area, which offered the greatest difficulties in drainage. He dug filtration wells and then sowed seed of maritime pine and oak. The results were outstanding. In six years the trees reached a height of twelve feet, proof of the efficiency of his method. The state then passed an act under date of June 19, 1857, which ordered the drainage and reclamation of all communal lands in the Gironde and *Les Landes* provinces, affecting 750,000 acres. Each commune was to bear this expense out of the sale of a portion of the reclaimed lands.

The principal canals and secondary ditches were established with great success. The lakes were lowered, sometimes as much as six feet. The streams which ran along the dunes were rectified and conducted straight to the sea, and their banks were fixed with timbers and masonry. These open ditches were more satisfactory than had been predicted and required very little upkeep during the next thirty-five years.

The drained sandy soils were not suited for the culture of grains except at

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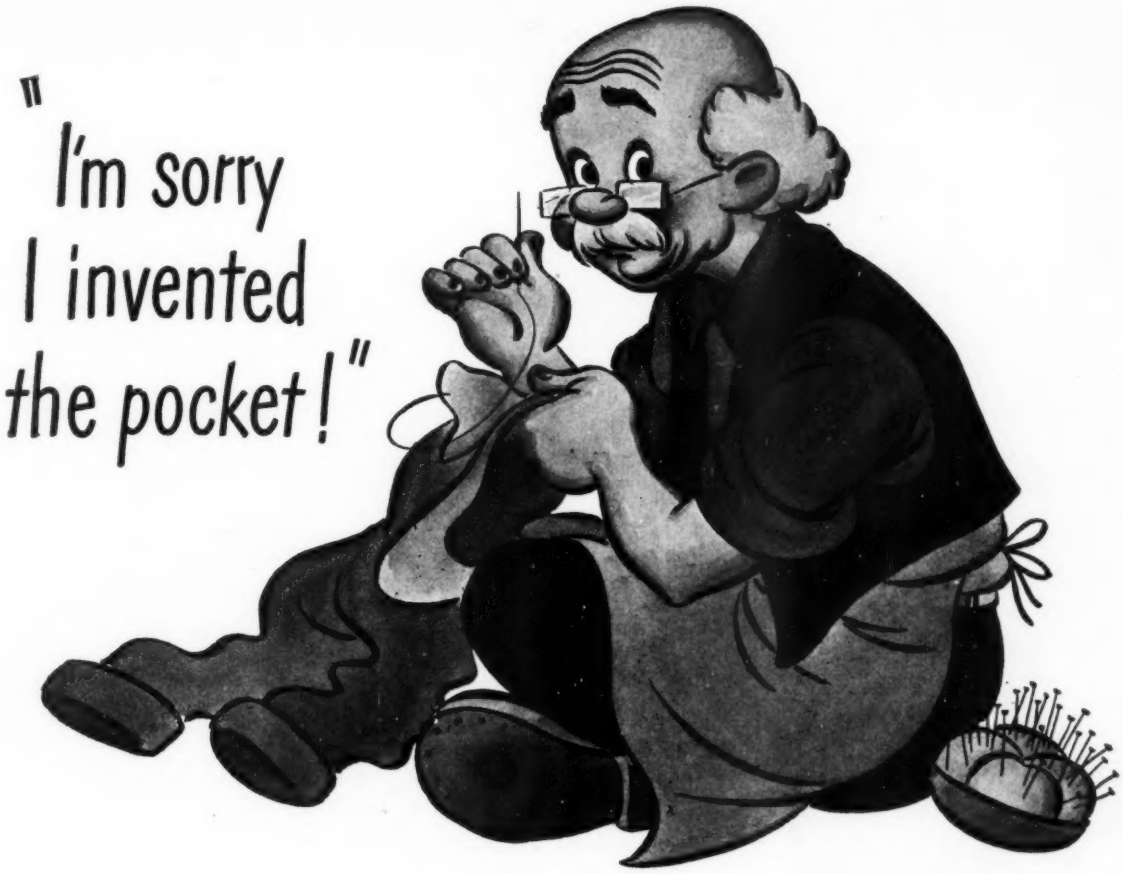

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very heavy expense. But isolated groups of maritime pine and oak indicated that the climate favored their rapid growth. The communes of *Les Landes* thereupon planted their reclaimed areas to these species. The private land owners began to follow this example, draining and reforesting their lands.

Money from the sale of a portion of the communal lands served for the building of town halls, churches, roads and the purchase of government bonds. Thus a country which was the poorest of all France was completely transformed as a result of its draining and afforestation. Aside from the vast increase in the economic wealth of the area, these projects brought public health. Chambrelent had deep wells dug which supplied good drinking water, and drainage removed the menace of malarial fever. It was a complete economic and physical rejuvenation for the people of this area.

About this time a great impetus was given this reclamation work by the Civil War in the United States. America no longer exported resinous products to Europe. A barrel of gum formerly selling for twenty-five or thirty francs increased in value to 300 francs. The price of timber also became much higher.

The cost of this reclamation work was small in comparison to the gains. While no record has been kept of the expense paid by individual land owners, expenditures by the communes amounted to 13,431,942 francs, or about $2,686,000. Twenty years later, in 1877, the value of their forest lands which had not been sold to pay the cost of the project and town improvements was 80,264,000 francs, or about $16,000,000. Value of the once almost worthless private lands now had an estimated value of 125,000,000 francs, or $62,000,000 in forested areas:—a total valuation of 205,000,000 francs, or $102,500,000. Henceforth, whenever the forests were cut they reseeded naturally and needed no further planting.

These new maritime forests, up to the time of the Nazi invasion of France, provided a huge export trade in pit-props or stulls. For more than a half century, English ships laden with coal from Wales returned with an equal cargo of mine-props. Algeria, Tunisia and other Mediterranean countries also imported these products. The annual yield of the forests was around 384 board feet an acre.

Resin production, with a yield of about sixty quarts an acre a year, was of even greater value than the lumber. Total resin production was about 100,000,000 quarts, which permitted the manufacture of 20,000,000 pounds of turpentine.

An efficient procedure has been worked out for the management of these maritime forests, which are divided into compartments and grown to an even age.

Between the ages of four and twenty-five years, five or six "ax" thinnings are made. When trees reach a diameter of six inches tapping for resin begins. Some are selected to remain in the stand and these are said to be "tapped for life". On these, only one "face" is made in the bark to expose the resin canals. On other trees which have been selected to be cut in a thinning, three, four, or five "faces" are made, according to the size of the trunk. These trees are said to be "tapped for death". The excessive extraction of resin gradually reduces further growth and at the end of four years the trees are cut for timber.

The process of thinning every four years by tapping to death certain trees, continues until the final density of the stand is about sixty-four to 120 large trees an acre. These trees are then "tapped for death" for four years and a final clear cutting for regeneration is made. The length of rotation is seventy-two years, except for those compartments near the ocean where it is shorter. The forest comes back naturally, from the seed on the trees in the final cutting.

The resin is harvested from March to October. About once a week the "face" is cut a few inches higher to expose the resin canals of the wood until from thirty to thirty-five cuttings are made. Each "face" produces more than a quart a season. The resin flows down the grooves of the "faces" into a zinc curved blade which passes the gum into varnished porcelain pots. Collections are made about once a month and the gum placed in huge barrels for delivery to the shipping center and refineries.

The timber is sold on the stump. Slash is cleared away from the roads to reduce fire hazard and then is left on the ground to rot. An extensive lookout system has been developed for the prompt detection of fires, and an expensive system of fire breaks is maintained throughout the forest. The small railroads through the forests which transport resin and timber are provided with fire fighting equipment; water tanks, drawn by horses or trucks, are also used for fire fighting. The entire forest is managed so that the maximum production of timber and resin is maintained.

A conception of what has been accomplished would be impossible without a comparison. Fortunately, near d'Arcachon, on the ocean, there has been left unchained on private land one mountainous white dune, as a reminder of the desolation before this contest of man against nature. This dune, two miles long, a half mile wide and 300 feet high, is ceaselessly at work, swal-

lowing the adjoining forest at the rate of sixty or sixty-five feet each year.

It is inspiring to stand on the crest of this giant white wave of sand and reflect on this achievement. Here one can gaze inland across the billowy sea of dark green forests as far as the eye can see to the north and south and east, and marvel that this entire area was also like the restless giant underfoot. Then only can one begin to appreciate the magnitude of the accomplishment of converting this former vast menace into a resource.

Hemlocks of Crater Lake

(*From page* 379)

Patiently they bided their time. Meanwhile, nature went about the business of building up soil in which they could grow. First she encrusted the bare crags with lichens, those tiny plants that collect dust like a carpet, hasten the decay of stone by chemical action of their rootlets, and then enrich the soil thus produced by the humus of their own dead bodies.

Following upon the lichens came the mosses and ferns, making use of the dirt so prepared to continue the process on a larger scale. Eventually the soil was built up to a degree that made it favorable for the growth of grasses and flowering plants. They in turn lived and died, preparing the way for shrubs which also did their share toward bringing nearer the day when trees could find nourishment in the volcanic debris.

Of course there is no beginning and no end to this process of nature. Often, too, she sees fit to make the stages overlap or even reverses them when other factors enter. She is still at work upon the rock piles of the world where occasionally she takes special pains to display the various steps in soil manufacture in such a way that the eye may take in all of them at once. Near the summit of Garfield Peak is such a spot. There, on a craggy outcropping, is written the life story of the forest in lichens, mosses, ferns, grasses, flowers and shrubs, climaxed by a single hemlock.

Unquestionably many centuries of preparation were required before the hemlocks could migrate over the rim to set about their mission of opposing forces of destruction, healing scars and taking their place in the creation of beauty—of beauty assured even then by the gathering of waters that concealed much of the mountain's gaping wound.

Is it any wonder, considering this story from their past, that the habitual attitude of hemlocks in facing the future is that of humility, symbolized by their bowed heads? Nor is theirs the resigned humility of meekness and submission. Theirs is the proud humility arising in those who know themselves to be a part of all that has gone before, of all that is yet to come—and who are grateful that they may contribute, even in a small way, toward creating that which is true and beautiful and good.

Perhaps words alone are inadequate to carry to those unfamiliar with the hemlocks at Crater Lake the realization of how richly significant a sense of companionship with them can be. Perhaps a true understanding is possible only to those who experience the relationship for themselves, allowing "the interplay of little things aided by the kindly work of time" to have effect.

There is no doubt but that those who are so fortunate may find, through spacious interludes spent among these gracious yet stoic trees, relief from the trivial-minded minutes that press in upon our days. Because of what the mountain hemlocks have to give, not knowing that they give at all, life cannot crowd so close; for they have a way of making us conscious of growing always "more native to our source."

When Pilots Walk Back

(*From page* 395)

his occasional shouts he seemed to be ahead, and they were therefore surprised upon reaching camp at dark to find that he was still out in the woods. It had been a beautiful day, clear and warm for September, but the temperature was now dropping rapidly. It was known that the lost camper was dressed in shorts and had only a light jacket. He had no matches or flashlight, but did have a compass. Wherever he might be, further travel that night through the thick second growth forest would be hazardous. Under foot, the rough terrain with frequent rocks and hidden pitfalls could easily produce a sprained or broken ankle, to say nothing of dead projecting tree branches waiting to scratch out an eye. Under such conditions no one with any experience would try to travel until daybreak.

In this case, however, with the temperature already at fifty degrees, a man would have to be quite active, or be exceedingly uncomfortable. So at nine o'clock, with the camper still missing, a searching party was organized and sent out along the trail toward the mountain. Stopping every few minutes to shout, and then listening while the echoes died

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away, the searchers finally heard a faint answer. Several hundred feet farther along, one man was left with a lantern so that there would be no trouble in getting back to the trail.

The answering shouts grew stronger, but strangely they seemed to come from some distance above the ground. And so they did, for the lost camper was up a tree! He was in quite good possession of himself, but several minutes before he heard the searching party the stillness had been shattered by a peculiar series of eight "barks,"—or so they sounded to him—repeated several times. The hair rose up on the back of his neck and he quickly looked for a place of safety off the ground. He explained that he wasn't going to be "chewed up by a bunch of dogs." The title of this little story might be "Treed by an Owl."

Amusing as this may sound from a distance, it was not at all so to this boy. Suppose he had been a transport pilot with several injured passengers on his hands. This bit of forest lore would have been comforting at least, if not critically important.

Recently, by sheer determination and unusual physical energy, a pilot managed to force his way from his crashed plane through the jungle to civilization. He admitted to traveling a "bee line" through swamps, and that he ate nothing for three days. A man with even a little knowledge of wild country would have taken his time, avoided swamps if possible, found some vegetable or animal to eat, and would have come out in reasonably good condition. In any event, what is the use of spending $20,000 to train an airman if, during that training, he is not taught the things which will enable him to survive and travel on foot from any part of the world that an emergency may place him?

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WHO'S WHO
Among the Authors in this Issue

DORIS PAYNE (*My Friends, The Hemlocks of Crater Lake*), Corporal, is attached to the Public Relations Office of the W.A.C. at Des Moines, Iowa. Before her service in the Army, Mrs. Payne devoted herself to the deep study and fundamental interpretation of nature. A native Californian, Mrs. Payne was graduated from the University in 1931, where she majored in philosophy. She immediately started writing and published her first book in 1938.

WALTER C. LOWDERMILK (*Les Landes*), soil erosion expert, scientist and world traveller, tells the early, dramatic story of land reclaimed in the maritime pine region of France, brought into full production of naval stores, only to have met who knows *what* fate today.

ARTHUR HAWTHORNE CARHART (*What Deer Eat*), pioneer recreation engineer of the Forest Service, made a record in planning for the recreational use of 23,000,000 acres of federal forest land in six states. He is perhaps even better known for his prolific writing, having been at it since 1920, with some eight hundred published articles and ten books to his credit. He is State Coordinator in Colorado of Federal Aid in Wildlife Restoration.

DEVEREUX BUTCHER (*Green Gardens*), native Pennsylvanian, ardent conservationist and widely known photographer, is Secretary of the National Parks Association at Washington, D. C., and editor of the National Parks magazine.

E. S. HURD (*Forestry By Free Enterprise*) is an Iowa State College forester, class of '35. With the U. S. Forest Service for five years, he took his master's degree from Harvard in 1941 and has since been engaged professionally in industrial work.

W. M. HARLOW (*When Pilots Walk Back*), of the faculty of the New York State College of Forestry at Syracuse, teaches wood technology there.

J. P. KINNEY (*A Tree As A Court Witness*) is assistant director of the Soil Conservation Service of the Department of the Interior. A Cornell forester, and graduate lawyer, Mr. Kinney engaged in forestry work with the Indian Service from 1910 to 1942. He has contributed several standard works to the literature —notably *Essentials of American Timber Law* and *A Continent Lost — A Civilization Won.*

L. T. NIELAND (*Florida's Timber-Grazing-Game Program*) is an extension forester, attached to the College of Agriculture of the University of Florida at Gainesville, Florida.

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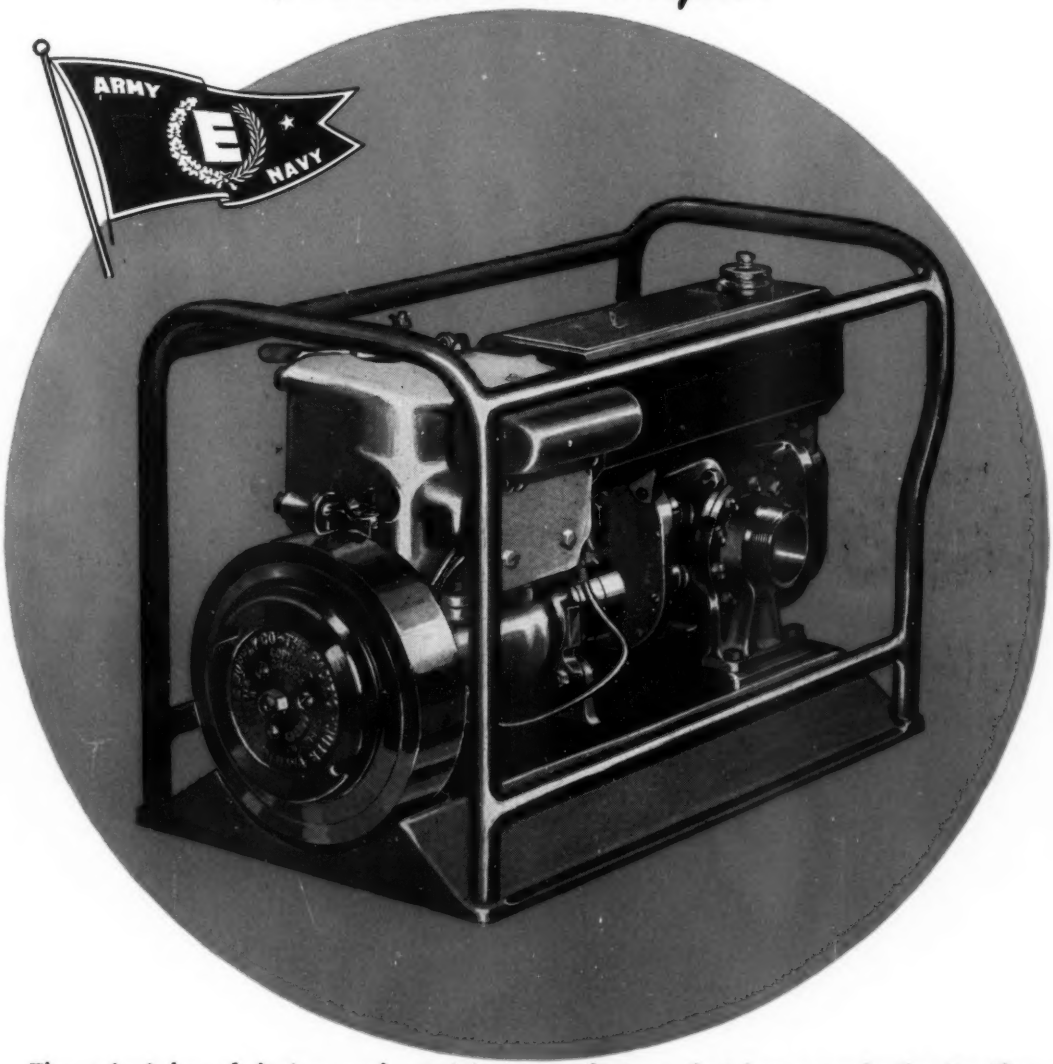

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